

FARM STUDIES IN IRAQ

(AN AGRO-ECONOMIC STUDY OF THE AGRICULTURE IN THE
 HILLA-DIWANIYA AREA IN IRAQ)

(met een samenvatting in het Nederlands)

by/door

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(Received/Ontvangen 17.11.'61)

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EXPLANATORY NOTES

DEFINITIONS

| | |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Tenant | = a farmer cultivating land exclusively under sharecropping contract and socially tied to the landowner: abbreviation T. |
| Farmowner | = a farmer cultivating fields which are in his own possession: abbreviation F. |
| Gross area | = total land in a specific area. |
| Waste land | = land unsuitable for agriculture. |
| Arable land | = land, which is suitable for agriculture or can easily be made suitable for agriculture. arable land = gross area less waste land. |
| Idle land | = land potentially suitable for agriculture, but at present in use for other purposes. |
| Farmland | = land taken up in a rotation system, including areas permanently under crops. |
| Cultivated land | = land cropped during a period of a year, including permanently cropped areas. cultivated land = farmland less fallow land. |
| Fallow land | = farmland lying fallow within the rotation system. fallow land = farmland less cultivated land. |
| Miri land | = land the ownership of which basically belongs to the state; the right of utilizing may be given by the state to individuals. |
| Mulk land | = land held in absolute ownership. |
| Waqf land | = land dedicated to certain educational or charity institutions or purposes. |

IRAQI MEASURES

one meshara = 2500 m².

one Iraqi Dinar (abbreviation ID) = one English £ = \$ 2.80.

one fils = one thousands of a Dinar.

INTRODUCTION

From December 1, 1957 till April 30, 1958 and from October 1, 1958 till May 30, 1959, surveys were carried out in connection with planned irrigation improvements in the south-west of Iran and a drainage scheme in Iraq.

The irrigation project in Iran covered an area of 125.000 ha. on both sides of the river Dez, in the province of Khuzestan. A technical study was not only required, but also basic facts had to be collected regarding the agricultural economic setting needed for a well founded advice on the size of farms and on the economical aspects of the project. The study was entrusted to *Nederlandse Heidemaatschappij*.

The drainage project in Iraq included an area of 400.000 ha. located between the towns of Hilla and Diwaniya on both sides of the Hilla and Daghhara canals. This area is subject to strong salinisation of the soil, and in order to stop further deterioration of the soil and to improve the agricultural conditions, drainage is considered necessary. The Iraq Government called in *Netherlands Engineering Consultants (Nedeco)* for the planning of a drainage scheme. On behalf of *Nedeco Nederlandsche Heidemaatschappij* and Messrs Dwaars, Heederik & Verhey carried out the investigation and the planning.

In both projects the author was appointed to collect the data regarding the agricultural and economic conditions and prospects which would be needed for an evaluation of the projects and which should provide the agricultural basis for the technical designs.

Irrigation and drainage are as a matter of fact technical measures aiming at the development of the agricultural potentials and an increase of the production level. Irrigation and drainage systems open up possibilities for improvement of agriculture, but no more. The efficiency of the irrigation and drainage systems depends to a large extent upon the skill and willingness of the farmer to make use of the newly created possibilities in the proper way. For, in agriculture it is the farmer who in the end decides whether certain measures will be applied on his farm. Therefore, technical measures which aim at an increase of the income of the farmer and through him of the income of the country depend ultimately on the willingness and ability of the farmer to utilize the possibilities presented to him.

The aim of this agronomic study has been to gain a thorough insight into the general and economic conditions of the farmer in the Hilla-Diwaniya and Dez areas. Therefore the present farming standard, the income level, the prosperity level and the subsistence aspects have been studied extensively.

Because the survey in Iraq has been more intensive than the survey in Iran, the results of the study concerning the Hilla-Diwaniya project are presented in this publication. However, the survey methods followed in this area were based upon experience gained in Iran; therefore the investigation methods in both projects will be discussed.

When reading these pages it should be kept in mind that in Iraq since the revolution of 1958 the laws concerning land tenure have drastically changed but that at the time of the surveys in the field the old system of landlords and tenants still existed.

In many less developed countries technical measures like drainage and irrigation are nearly always unavoidable as a first step towards development, but without a follow-up aiming at a general agricultural development by means of agrarian reform, agricultural education and extension, plant protection, fertilizing, selection and improvement of the live-stock and crops and agricultural credit facilities etc., such technical measures will not attain their full end.

Technical measures and their application have to be adapted to the circumstances and human conditions prevailing in the area under consideration. Probably the most valuable asset in developing backward economies is the knowledge of the basic economical values of the population concerned. The appraisal of these values gives a basis to decide what can be done, how fast it can be done and what resistances may be expected. The knowledge of the socio-economic situation proves extremely useful and the success or the failure of a technical project may rest upon details that at first seem of minor importance to the technical planner.

The data collected are dealt with in such a way as to bring forward a series of basic data regarding the economics of subsistence farming on which the agriculture in these regions still appears to be based. This field of knowledge must be considered to be of primary importance for the planning of measures for the economic development of less advanced countries. This knowledge itself is still in its infancy and deserves much more attention and study.

CHAPTER 1

GENERAL ECONOMIC SETTING OF IRAQ

1.1. IMPORTS AND EXPORTS

Iraq is an agrarian country and apart from oil-winning few industrial activities are found. Although in oil Iraq possesses not only a source of foreign exchange but also a cheap source of power and raw materials, economically the structure of the country is to a great extent determined by an underdeveloped agriculture nearly on a level of subsistence farming in large parts of the country.

This economy is reflected in the imports and exports as given in table 1.1.

TABLE 1.1. Imports and exports by main commodities in 1957 (14)

| | In 1000 ID | |
|-----------------------|------------|---------|
| | Imports | Exports |
| Agricultural products | 23,458 | 10,622 |
| Oil | — | 113,155 |
| Other products | 88,588 | 2,289 |
| Total value | 112,046 | 126,066 |

The oil wealth yields the greater part of the income of the Government, either directly or indirectly.

1.2. POPULATION

The following table shows the figures of male and female population for 1947 and 1957.

TABLE 1.2. Population in Iraq (in millions) (14)

| | 1947 | 1957 | Increase | Annual % increase |
|---------|------|------|----------|-------------------|
| Total | 5.20 | 6.50 | 1.30 | 2.35 |
| Males | 2.65 | 3.30 | 0.65 | 2.40 |
| Females | 2.55 | 3.20 | 0.65 | 2.30 |
| Rural | 3.45 | 4.05 | 0.70 | 2.00 |
| Urban | 1.75 | 2.45 | 0.60 | 2.80 |

The differences between the preliminary estimates of the 1957 census of population with the previous one in 1947 is striking. The nomad pastoralists are a typical element in the non-urban population of Iraq, amounting to some 250,000 persons (5% of the total population) according to the latest data. The average density of the population of Iraq is only 26 persons per km².

The number of persons employed in a gainful occupation in Iraq has been estimated at about 2 million for the year 1956. This figure excludes students, soldiers, pensioners, etc. and also house-wives and other women engaged in unpaid domestic duties.

The distribution is as follows:

TABLE 1.3. Distribution of the working population in Iraq in 1956 by sectors. (14)

| | Number engaged (in thousands) | Percent of total |
|---------------------------------------------------------|----------------------------------|---------------------|
| Agriculture | 1,610 | 78.8 |
| Industry and public utilities | 115 | 5.6 |
| Mining of petroleum | 13 | 0.6 |
| Transport | 56 | 2.7 |
| Building public works and banking | 38 | 1.9 |
| Distributive trades | 60 | 2.9 |
| Service industries | 38 | 1.9 |
| Personal services, including Government and professions | 116 | 5.6 |
| Total | 2,046 | 100.0 |

Agriculture absorbs nearly four fifths of all persons gainfully employed, a proportion totally out of line with the contribution of agriculture to the national income, one of the conspicuous aspects in particular of less developed countries (cf. table 1.6.).

1.3. AGRICULTURE

According to the Agricultural Census of 1952–1953 farmland amounted to 22.6 million mesharas, of which 10.1 million were sown and 11.2 million were fallow. The remainder was used for orchards, vine-yards, permanent pasture, etc.. Consequently no less than half the farmland lies fallow every year, while only a fraction is employed on high value (summer) crops. More than nine tenths of the farmland area are sown with barley and wheat, while the only important summer crop is rice.

According to an unofficial estimate the total live-stock of Iraq (excluding poultry) is made up of 10 million sheep, 3 million goats, 1.5 million cattle, 0.7 million buffaloes and 1.8 million other animals (59). The 1952–1953 Agri-

TABLE 1.4. Agricultural output (54)

| Commodity | Output (1,000 tons) | Value of output ¹⁾ (1,000 ID) |
|-----------------------|------------------------|---------------------------------------------|
| Wheat | 877 | 19,000 |
| Barley | 1,079 | 13,000 |
| Rice | 130 | 3,900 |
| Cotton | 44 | 3,100 |
| Dates | 350 | 3,500 |
| Oil seeds | 15 | 500 |
| Fruits and vegetables | — | 6,000 |
| Corn and sorghum | 200 | 2,000 |
| Tobacco | 7 | 1,000 |
| Forage crops | 1,250 | 2,500 |
| Total Agriculture | — | 54,500 |
| Animal products | — | 20,000 |
| Forest products | — | 500 |
| Grand total | — | 75,000 |

¹⁾ Current prices 1957.

cultural Census enumerated 4.5 million sheep and 1.6 million goats on agricultural holdings.

The agricultural output (1957) is estimated in table 1.4.

The land tenure in Iraq is a pattern of very big landowner holdings and relatively small units of family owned farms.

The distribution of land holdings in 1952-1953 according to size is given in the following table:

TABLE 1.5. Distribution of land holdings by size 1952-1953 (59)

| Size (in mesharas) | Number (in thousands) |
|-----------------------|--------------------------|
| Under 40 | 76.0 |
| 40 — 79 | 19.4 |
| 80 — 199 | 23.9 |
| 200 — 399 | 7.9 |
| 400 — 799 | 3.4 |
| 800 — 1,999 | 3.0 |
| 2,000 — 3,999 | 1.2 |
| 4,000 — 9,999 | 0.7 |
| 10,000 and over | 0.3 |

The former Government published only the number of holdings in each size interval with no indication of the size of farms actually operated by farmers. Thus the value of the figures is limited and gives no real data about the size of the farms of farmowners or tenants.

The key to agriculture in Iraq is irrigation water. Taking Iraq as a whole it may be said that land resources in relation to labour would be abundant, if water were made available. Agriculture in the northern region of the country is rainfed. In the central and south areas agriculture is possible only on irrigated land. In the central part frequent overirrigation results in increasing salinisation of the soil because drainage is lacking. In the most southern part of the country there is an adequate drainage on account of the tides.

The Hilla-Dyaniya area is situated in the central part.

1.4. NATIONAL INCOME

The national income of Iraq in 1956 has been estimated at ID 303 million which comes to about ID 48 per head (or some U.S. \$ 140). Superficially this compares well with other countries in the Middle East and is more than twice that of India or Iran. Moreover, real income per head has risen by two thirds since 1950 (14) (24).

The growth of national income and the contribution of agriculture and the oil industry are illustrated in table 1.6.

The estimates of the income per capita for 1950 and 1956 are for the various sectors:

| | 1950 | 1956 |
|-----------------------------|-------|--------|
| Agriculture | 17 ID | 16 ID |
| Non-agriculture and non-oil | 75 ID | 120 ID |
| Disparity factor | 0.23 | 0.13 |

TABLE 1.6. National income of Iraq (in millions of ID) (54)

| | A. Current prices | | | | | | |
|----------------------------|-------------------|------|------|------|------|------|------|
| | 1950 | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 |
| Total national income | 158 | 184 | 217 | 259 | 268 | 289 | 303 |
| Oil industry | 8 | 19 | 44 | 57 | 75 | 81 | 76 |
| Non-oil sectors | 150 | 165 | 173 | 202 | 193 | 208 | 227 |
| of which agriculture | 72 | 73 | 72 | 79 | 84 | 62 | 78 |
| Per capita national income | 28 | 32 | 37 | 44 | 44 | 47 | 48 |
| of which non-oil sector | 27 | 29 | 30 | 35 | 32 | 32 | 36 |
| Imports | 38 | 52 | 62 | 96 | 73 | 98 | 113 |
| B. Constant (1956) prices | | | | | | | |
| Total national income | 165 | 179 | 199 | 276 | 291 | 307 | 303 |
| Per capita national income | 30 | 31 | 34 | 46 | 48 | 49 | 48 |
| of which non-oil sector | 29 | 28 | 28 | 37 | 35 | 35 | 36 |
| Population (millions) | 5.6 | 5.7 | 5.8 | 5.9 | 6.1 | 6.2 | 6.4 |

It can be seen that the two thirds increase in per capita real income since 1950 has been due almost exclusively to the striking expansion of the oil industry and that there has been relatively little progress in the rest of the economy, more particularly in agriculture. There has been nevertheless a fast rate of increase of imports, namely three times the level of 1950 in value.

CHAPTER 2

THE INQUIRY METHODOLOGY

2.1. GENERAL

The experience gained in a former survey in Iran proved to be very helpful during the survey in Iraq. Therefore, although the survey in Iran was less extensive, it was thought useful to present the survey methodologies of both Iran and Iraq, while only the results of the Iraq survey are worked out. The purpose of the surveys was to acquire an insight as detailed as possible into the agricultural economic situation of the farmowners and tenants of the areas. Several difficulties were encountered in both survey areas and it may be expected that in the Middle East each specific area will present other characteristics.

The staff of the surveys consisted in Iraq of the indispensable interpreter, the author of the present work and three students of the Agricultural University of Wageningen. In Iran an economic trained Iranian acted as interpreter. All interviewing was done by the staff itself. The interpreters in Iraq had to be trained before they could be put to work. The survey was performed in accordance with a plan made beforehand. First of all a literature research was made at the home office after which the aerial photographs were studied. Then the survey was continued in the field. This field survey consisted of:

1. A reconnaissance study: a provisional study to collect basic data from the official sources and to acquire insight in the conditions of the area in order to be able to make a classification into agricultural regions.

2. The sampling of a limited number of farmers and landowners in accordance with a certain scheme. The choice of the farmers and landowners to be interviewed was made in accordance with a certain sampling technique.
3. The interview: in order to collect the necessary data farmers and landowners were interviewed.
4. The preliminary analysis of figures and data and the straightening out of inconsistencies in further interviews.

2.2. THE OFFICE SURVEY

The office survey was that part of the survey which could be carried out at the home office before entering the field.

2.2.1. *Literature research*

Before starting the field survey proper the existing literature on economical, agricultural and social aspects of the areas and of the relevant country was studied at the home office. Apart from some more specific studies, such as 'Landlord and Peasant' (31) and some land tenure studies (28) (42), the bulk of the literature does not give more than a general idea about the country, the agriculture, the economy and/or the population; detailed studies were found to be very scarce. With regard to the areas which had to be surveyed, practically no knowledge appeared to be available (8) (12) (57). Besides the agricultural economic literature (15) (31) (33) (36) (48) (54) (58), also literature about religion and the attitude towards life of the Persian and Arab people was studied (2) (20) (22) (31) (47).

2.2.2. *The study of the aerial photographs*

Another important part of the home office survey was the study of the aerial photographs of the areas. Agricultural surveys covering large areas are without the help of aerial photographs, if not quite impossible, at least very time-consuming. Especially in less developed countries where – as was the case in Iran – neither cadastral, nor topographical maps, nor maps of the irrigation system are available, aerial photographs can be of great help. In Iraq a cadastral map, though obsolete, could be used for the field work, but also here a road map was not available. Consequently such a map had to be drawn up by the field team and for this purpose the aerial photographs were extremely useful.

The advantage of aerial photographs is that the position of rivers, roads, villages, hills and other important characteristics are clearly shown. In the arid and semi-arid areas aerial photographs are particularly useful because the topographical situation is hardly disturbed by trees or other overgrowth. Another great advantage of aerial photographs is that they give the investigator a clear bird's eye view of the total area, which can be studied at any time at the office and from which he acquires an excellent picture of the mutual coherence, especially by using mosaics on a small scale (1:50,000). However, for the field work mosaics on a scale of 1:25,000 were made, which proved to be more useful.

The study of the use and the advantages of aerial photographs in less developed countries are extensively described by several authors (7) (13).

When using aerial photographs several factors have to be taken into account. Field surveys are absolutely necessary to interpret the aerial photographs correctly. The ideas conceived in the office have to be checked in order to understand and distinguish the different characteristics.

An aerial photograph usually shows more than can be discovered in the field, since it can tell a story of ages, especially in the Middle East, where there was a flourishing culture centuries ago. Another problem is the timelack between the dates of the aerial survey and the field survey. A different agricultural pattern may be found in the field if this survey is carried out in another season than the aerial survey. It is therefore important to know when the photographs are taken. The weather conditions of the days on which the flights are carried out may differ. This might result in darker or lighter colours of the different parts of the compound mosaic. Variety of colour can also be caused by differences in humidity of soil. Without field surveys it is impossible to say what varieties one has to do with.

Because the cultivated areas are coloured considerably darker than the fallow or idle lands, it is possible to measure the different areas by means of a planeograph. As reliable official figures were lacking, the aerial mosaics supplied the investigator with quantitative data without which a classification in regions of typical agricultural patterns would hardly have been possible.

2.3. THE FIELD SURVEY

2.3.1. *Reconnaissance survey*

The reconnaissance survey was the first phase of the field survey in the areas. It can be divided into two distinct stages:

- a. the survey of official sources of information;
- b. the initial field survey;

resulting in a classification of the areas into agricultural regions.

The survey of official sources of information.

After an interpreter had been found (cf. 2.3.3) and an appropriate means of conveyance was at disposal, which was all-important on account of the long distances and bad road conditions, an official visit was paid to the highest government official in charge of the area in which the areas lay. The purpose of the study was explained and the cooperation of the officials was made sure of. The subsequent calls to the less important officials were utilized to get hold of all available statistical data concerning population, farmsize, live-stock, yield of crops, etc..

In Iran as well as in Iraq these first calls were not too successful, they are however indispensable. They are not only a matter of courtesy but they are also needed to acquire the cooperation of the local authorities without which the survey may be jeopardized. It was necessary for the staff to get used to the manners and customs of the population and the way of approach had to be adapted to the nature and mentality of the people. Moreover, the investigator himself was not yet sufficiently well informed at that stage to put the questions in the precise way. Therefore a more intensive questioning of these officials was delayed until more insight was acquired into the local conditions and situations. Later on when some more experience and knowledge was gained the

results were much better. Anyhow there were enough days available to call on these officials when weather conditions hampered the fieldwork. Still it was necessary to find out during these first visits whether cadastral and topographical maps, maps of the irrigation system as well as road maps and/or maps showing the locations of the villages were available, and if so, whether copies could be acquired or whether they had to be made by the surveyors themselves.

In this stage of the survey a list was made up of the names of villages, irrigation canals, etc., which were found on the various maps. To prevent confusion the various members of the research team agreed upon provisional names of the villages, etc.. As the information about the areas increased, it was possible for the staff to improve and complete the original list accordingly. For the final wording of the report, a definite spelling of the names of the villages, etc., was decided upon.

The initial field survey

Normally a team of fieldworkers sent out by a consulting firm is not familiar with the conditions prevailing in the area under study. An important part of the initial field survey therefore was a number of field trips which were essential to make the investigators familiar with the areas and to make them accustomed to the interpretation of the aerial photographs. For this purpose the drawing up of a map of the passable roads and a landuse map on the mosaics was very useful.

The designing of the roadmap was done by all team members together. Although the work would advance more quickly, if every member took a part of the area for his account, working together was preferred because in this way there was an excellent opportunity for them to get used to each other and to acquire knowledge of the geography of the area. The team of fieldworkers got the first impressions of the new and most unusual surroundings and were then afterwards in a better position to recognize on the mosaics the objects in the field and to distinguish the different agricultural patterns.

The landuse map could be drawn, be it roughly, from the aerial photographs. During the initial field survey, it was possible to mark for exclusion the areas not suitable for agriculture like floodplains, rivers, roads, waste land, such as dunes, hills, etc.. The landuse map provided an impression of the land suitable for agriculture and facilitated the classification of the area into specific areas with specific agricultural and economical aspects.

The reconnaissance study resulted in a preliminary classification of the areas into agricultural region. This classification is dealt with in Chapter 3.

2.3.2. *The sampling technique*

General

Naturally a survey of all the units of a 'continuum' provides the most reliable data, though it is time-consuming and expensive and superfluous for the purposes of such a study as the present one. The survey of a certain percentage of the units is sufficient, provided a number of aspects is not lost sight of in making the choice. Therefore a certain insight into the characteristics of the 'continuum' is indispensable.

A statistical sample is a cross section of the entire group. The sample must

represent all the characteristics found in the group, otherwise it will give misleading results. W. Y. YANG (50) writes: 'When about 20 farms for cross tabulation included in one class have been interviewed, the addition of more farms will not materially change the results.' This might be true, because in this case he refers to farms which possess similar characteristics or fall within the range of specific upper and lower limits of a recognized variable. But the difficulty is that it is hardly possible to recognize this sort of classes in less developed countries at the beginning of a survey. Therefore the investigators stuck to the theory: 'The larger the sample, the better the estimate.' (25). However, size only does not guarantee that the estimate will be accurate.

More practical is the stratified sampling, which means taking from the group concerned samples in sub-classes having certain characteristics in common which are easy to recognize and relevant for the survey.

The stratified sampling in the areas was based on a classification according to the type of agriculture and land tenure.

The sampling in the Dez area

The farmers in Iran live exclusively in villages which are joint-owned by landlords who possess a share in the production. In the villages there are three groups of inhabitants: farmer-tenants, farmhands and part-time agricultural labourers. In the villages there are no non-agriculturists. All farmers are tenants. Farmowners were not found in the Dez area apart from a few around the town of Dezful. This, as a matter of fact, simplified the survey considerably.

In each class of the classified area a number of villages was selected for the survey. This number was dependent on the total number of villages in the class and their size. For this selection it was necessary to mark the situation of the villages on the mosaics, because then the spreading of the villages in the area would be clear. By paying short visits to all villages it was possible to note down the names of the villages and of the owners, and moreover it was possible to check the classification of landownership made previously. Three classes of landowners were encountered named 'powerful', 'middle class' and 'small' landlords in accordance with the magnitude of their interest in the land (cf. figure 3.1).

Figure 2.1 shows the spreading of the villages of which data were collected. In the dry farming area 36.4%, in the irrigated farming area 'powerful landlords' 24.3%, 'middle class landlords' 23.9% and among the 'small landlords' 21.3% of the total number of villages were surveyed.

It is a mathematical theory that, if only a few objects of one class are available, 100% has to be investigated, whereas if there is a great number of them, a smaller percentage may lead to a safe conclusion. Therefore the percentage of the villages investigated in the dry farming area had to be considerably higher than in the irrigated areas.

The sampling in the Hilla-Diwaniya area

The sampling in this area was also based on the landtenure conditions. Here were besides powerful and middle class landlords also farmowners encountered.

To acquire the right spreading of sampling during the inquiry the area classified was panelled as follows:

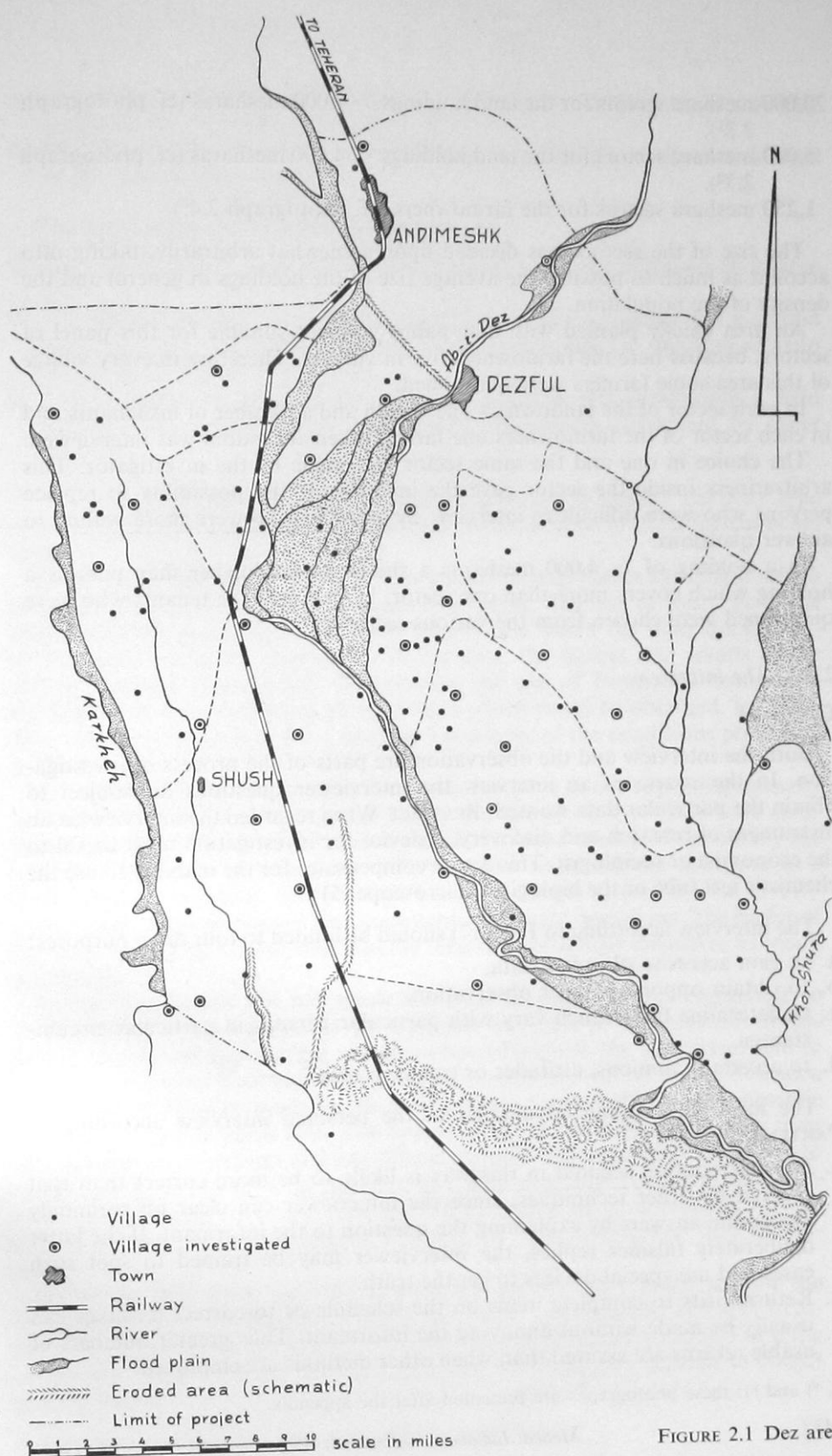


FIGURE 2.1 Dez area

- 20,000 meshara sectors for the land holdings $> 4,000$ mesharas (cf. photograph 2.2¹⁾,
- 5,000 meshara sectors for the land holdings $< 4,000$ mesharas (cf. photograph 2.3²⁾,
- 1,250 meshara sectors for the farmowners (cf. photograph 2.4³⁾.

The size of the sectors was decided upon somewhat arbitrarily, taking into account as much as possible the average size of the holdings in general and the density of the population.

An area chiefly planted with date-palms was not suitable for this panel of sectors, because here the farmowners live in villages. Therefore in every village of this area some farmers were questioned.

In each sector of the landowners one sheikh and a number of his tenants and in each sector of the farmowners one farmer taken at random was interviewed.

The choice in one and the same sector was made by the investigator. This arbitrariness inside the sector gave the investigator the possibility to replace persons who were difficult to interview by persons who were more willing to answer questions.

In a holding of $> 4,000$ mesharas a sheikh or landowner may possess a holding which covers more than one sector. In that case the tenants who were questioned were chosen from the various sectors.

2.3.3. *The interview*

General

Both the interview and the observation are parts of the process of investigation. In the course of an interview the interviewer questions his subject to obtain the particular data wanted. BEATRICE WEBB regarded the interview as an instrument of research and discovery, a device for investigation most useful to the economist or sociologist. This device compensates for the inability to use the chemist's test tube or the biologist's microscope (51).

The interview according to FRY (17) should be limited to four main purposes:

- a. to gain access to objective data,
- b. to obtain opportunity for observation,
- c. to determine facts which vary with particular persons in particular circumstances,
- d. to ascertain opinions, attitudes or trends in belief.

The most outstanding advantages of the personal interview according to PARTEN (37) are:

- a. The information secured in this way is likely to be more correct than that secured by other techniques, since the interviewer can clear up seemingly inaccurate answers by explaining the question to the informant. If the latter deliberately falsifies replies, the interviewer may be trained to spot such cases and use special devices to get the truth.
- b. Return visits to complete items on the schedule or to correct mistakes can usually be made without annoying the informant. Thus greater numbers of usable returns are assured than when other methods are employed.

¹⁾, ²⁾ and ³⁾: these photographs are presented after the appendix.

- c. Questions about which the informant is likely to be sensitive can be carefully sandwiched in by the interviewer.
- d. The language of the survey can be adopted to the ability or educational level of the person interviewed.

The limitations of the personal interview are:

- a. The transportation cost and the time required to cover addresses in a large area.
- b. The human equation may distort the return. If an interviewer has a certain economic bias, for example, he may unconsciously ask the question so as to secure confirmation of his views.
- c. The organization required for selecting, training and supervising a field staff is more complex than that needed for surveys conducted by other methods.

In a less developed country the personal interview is usually the only type of investigation that will give reliable data, because most of the informants are illiterate.

In aid of the interviewer in both areas special inquiry forms were made which suited the local circumstances as much as possible. The use of forms gives the interviewer the possibility – for many persons are asked the same questions – to compare during the elaboration of the data, the figures and results of the different groups investigated. Nevertheless the use of forms did not refrain the field team from collecting all other data which could be obtained, for these data were very important for a broader knowledge of the conditions prevailing in the areas.

As it is hardly possible to make the forms complete at the beginning as many important facts were not discovered before the interview, the forms were completed and improved during the survey work. So in the course of the survey the personnel gradually became better informed and could ask the questions in a more adequate wording. On the other hand the danger arises that the investigators might become biased and less attentive to slight deviations. The leader of the team should be on the alert that the interviewers remain objective as much as possible.

As the interviewers did not speak the local language, it was impossible to work without an interpreter. Much attention was paid to the selection of this person. Besides an agricultural and economic education, the interpreter had to be able to interview both the socially important people, such as the landowners, and the simple illiterate peasants. He had to create a sphere that made it possible that both categories felt at ease. The farmers were met in a friendly way in their own familiar surroundings and any official attitude was avoided in order not to hamper the correctness of the answers. It is also very important that the interpreter is absolutely objective. The interviewers have to be constantly on the alert to prevent the interpreter not to insert his own 'knowledge' into the answers.

Before the field team started the interview proper, they made sure of the cooperation of the landowners. Even if the farmers complained of harsh treatment on the part of the landowners, the investigator remained neutral. For if the landowners did not favour the investigation it would be very difficult to collect reliable figures.

It was assumed that the person interviewed would try to answer as honestly as possible. This must have been the case for most answers, because for the illiterate farmer it is hardly possible to hoodwink the investigator constantly. Still at the beginning the investigator was apt to assume that the answers were not correct. This was mainly caused by the fact that the questions were too difficult for the farmers. Therefore the questions were simplified. If for instance information was wanted as to the number of live-stock of the farmer, questions were asked on the various kinds of animals separately. Even if the farmer said that he had cows, he was asked expressly the number of them. If it was asked how much milk was produced by a cow, the farmer answered for instance that his cow gave three bottles of milk. It was up to the investigator to find out, whether these three bottles of milk were the production of milking once or the total milk production of one day. In the same way it was necessary to ask the farmer for how many months of the year the cow gave milk.

The problem was even more complicated, if figures regarding the yield of wheat per farm were wanted. Suppose a farmer had a wheat acreage of 10 me-sharas. Such a farmer would, if interviewed, say quite seriously that his yield amounted to 400 kilos. By this he meant that only 400 kilos were left after he had paid 500 kilos for rent, 50 kilos to the agent responsible for the collection of the rent of the landowner, and 50 kilos to those who had done the threshing and the transportation of the crop. This example shows clearly that, before starting the inquiry survey, some basic knowledge of the typical feudal agricultural systems and methods is necessary. For people in less advanced areas are not at all accustomed to answer questions and the mere sight of an interviewer usually makes them nervous and little inclined to answer questions, because domestic problems, personal affairs and opinions are not discussed in the presence of outsiders. An Egyptian farmer, for instance, is reluctant to tell how much milk his buffalo gives daily, because in his opinion it will cause the milk to dry up. His answer to the inquiry is: 'Enough' (5). In Nigeria any attempt to measure a man's farm means trouble. In the same way, certain areas in East Africa were excluded from the recent world agricultural census on political grounds (16). The people in Iran were reluctant to give the ages of the members of their family in an interview because they supposed that, sooner or later, the data would be used to require military service of them. Moreover, quite a number of people who died during the last war were never reported to be dead to the official authorities, because sugar in that period was given on ratio of the number of persons per family. 'The interviewer has to reckon with exaggeration of the data on debts, cultivation costs, and with underestimating of the yields. The villagers do not maintain accounts of their income and expenditure and this makes it difficult to find out farmer's economic situation' (35).

The interview in Iran

It must be stated that from the survey no true picture of the existing agricultural economic situation could be acquired without checking and cross checking the data obtained. Therefore the data were collected from three different sources: from the representative of the landowner, from the tenants and from the landowner himself.

The social status of the inhabitants of the village needs some comment. The

chief authority in the village is the 'kadghoda'. In theory this man must be appointed by the next highest administrative officer, but in many cases this formality is not observed. In fact the landowners select and pay their kadghoda.

In the Dez area the villages are always ruled by only one kadghoda, even if there are more owners per village. There are two aspects as to the kadghoda's function in the village. On the one hand he is responsible to the officials of the government (especially the police officers). He represents the government and accordingly is feared and distrusted if he sides with the authorities. On the other hand he is the paid representative of the landlords and therefore he is responsible for carrying out the will of the landlords. The kadghoda is a resident of the village. He may or may not be literate. He has several duties: he assists the police officers in their investigations or arrests in the village and also helps to select male villagers for conscription. He settles disputes, punishes defiant people, controls the work gangs and the distribution of water. Though he may delegate his controlling functions to other village servants, he has the final say. His power in the village is well recognized.

Other people standing in high esteem in the village are the elders, the religious leader, and if there is a school, the school teacher. The elders may or may not act as an effective council. In some villages they are called in for consultation by the kadghoda and in others the kadghoda governs by himself. There is usually a permanent resident religious leader in larger villages, while travelling leaders visit the smaller ones on special occasions. Their influence varies greatly as does the respect shown to them. Some are politically quite active and many frequently read the newspaper to the villagers.

The social status in the village is based mainly on wealth and power. The homes of the kadghoda and the school teacher are the centres of social life. As there are no teahouses in the villages, villagers meet after work at one of these two houses, where they may on special occasions be feasted and where local events and to some extent national events are discussed, if in the group there is someone who has heard the latest news.

The almost servile condition of the peasantry is not due to a legal system, but originates in history and in the indifference or weakness of the unstable governments of the past. Equality of race and class is recognized by Moslem law. The present constitution of Iran and Iraq lays down that all citizens are equal before the law. A complete absence of caste is indeed characteristic for the social structure and it is easy to enter a higher social class.

Usually the kadghoda, preferably in the presence of some elders, was questioned first, then the inquiry of a number of tenants took place and afterwards the data obtained were checked with the information given by the landlords.

Before starting the study of the villages selected for inquiry, some other villages were visited to make the investigator familiar with the inquiry methods and to make him acquainted with all problems and difficulties which might arise.

In Iran it became clear that nobody in the village could supply any total figures on the number of farmers, live-stock, land acreage or whatsoever in the village present. Only the individual data of each farmer was known. Therefore in every village a list had to be made containing the names of all the farmers. The kadghoda with some elders could then give full information of every farmer. This information was checked by interviewing some farmers not present during the questioning of the kadghoda and the data obtained had to tally

with the data obtained from the kadghoda. Very seldom could considerable differences be found. A final checking of the figures of acreages, yields, live-stock, tenancy conditions, etc. was done by the investigators together with the landowners.

During the survey in the villages very peculiar acreage measures were met. A good understanding of the measures was indispensable for a correct inquiry.

The 'khish'

The unit of area in the Dez area is the khish. This is an area of land which can be tilled by one farmer who owns two draught animals. In one and the same village the khish always denotes the same size of land and is determined by the quantity of land which belongs to the village and the number of draught animals present in one village. As a farmer may own $\frac{1}{2}$, 1 or even more khishes, the number of khishes does not correspond with the number of tenants in the village. In some villages even a distinction is made between mule, horse or donkey khishes. The mule or horse khish is then 2 or $1\frac{1}{2}$ times as large as the donkey khish. In this case the tractive power of the animals is taken into account. In particular in the dry farming areas this difference is noteworthy. In other villages, and this is especially the case in the irrigated farming area, no special distinction is made between the different tractive power of the animals and here all khishes are of the same size.

After noting down the names of the khish holders (tenants who are entitled to till land) it was possible to determine the number of khishes per tenant and the total number of khishes per village.

The acreage of the khish is determined by the number of 'mahn' wheat.

The 'mahn'

The measures of acreage in the rural Dez area differ considerably from the normal Western European ones. The hectare and acre units are unknown and the farmer indicates his wheat, barley, rice, sesame or fallow area always in 'mahn' wheat.

Originally in the Dez area the mahn is a weight unit which corresponds with $7\frac{1}{2}$ kilos (in other areas in Iran the mahn is $3\frac{1}{2}$ kilos) (31). With reference to an area of land 1 mahn corresponds with an area which can be sown with $7\frac{1}{2}$ kilos of wheat seed. But the sowing density is not equal in the whole area and in order to know the landuse and yield, the investigator must examine the sowing density carefully in every village.

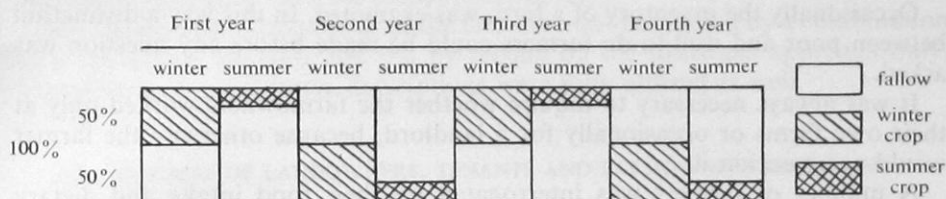
The cropping pattern in the Dez area

Without a full understanding of the cropping pattern in the areas an economic study is impossible. As basically the cropping pattern is the same both in Iran and Iraq, and even in large parts of the Middle East, this pattern will be dealt with extensively.

Even though the farmers have a rotation scheme, they find it hard to explain this system verbally and the investigator has to go to the fields with the farmers to get a good insight into the pattern. In the field the farmers can show what field was cropped in the previous year, what field is cropped now and what field will be cropped next year. In order to find out the cropping pattern, the time of the year at which a crop was planted and the frequency with which each

crop returned to the same field were examined. It is possible – since in the Middle East winter and summer crops can be grown – to crop a certain field in winter for 100%, but it is also possible to crop the same field for 100% in summer. The cultivation system in Iran and Iraq is still the old 'Niren-Niren' system, by which 50% of the fields is cropped and 50% is left fallow in winter time. The summer crops are planted in the same field that has been used for winter crops but, as the percentage of summer crops is very small, (only 5–10% of the total fields) the greater part of these fields is left fallow in summer.

The following figure gives an idea of this pattern:



As may be seen, the fields cropped in winter alternate every year.

The interview in Iraq

In the area in Iraq the agricultural population consisted of landowners, tenants and farmowners. It was decided to collect from the landowners general information about areas cropped, crops planted, cropping practices, yields and the number of their tenants. About 10% of the tenants of every landowner questioned were interviewed in detail. For checking purposes both the landowners and the tenants were asked the same questions.

The landowner was usually seen in the 'mudhif' (cf. chapter 3). During the interview the greater number of the landowners consulted their agents and their men of confidence, who more or less had the same function as the kadghodas who were met in Iran.

If the purpose of the interview was explained properly to the landlord and if the necessary regards were given him he was usually willing to cooperate. With some of them it was even possible to come to more friendly terms, and especially these landowners were of great help to explain historical agricultural ties and to outline the organization of the local agriculture. Although they did not forbid the interrogation of the farmers in their presence, they thought it useless, and therefore the tenants were questioned in their own surroundings, where they felt much more at ease.

During the interviewing of a farmer his relatives and friends gathered around and discussed the answers given and soon all farmers found it interesting to be questioned likewise. When, however, they had been present during the questioning of one of them they were no longer useful for our purposes, as they were prejudiced on account of the answers already given.

Another difficult circumstance was that usually the more well-to-do farmers were anxious to be questioned, whereas the poorer ones stayed behind. The latter, however, had to be questioned as well.

The investigator needs a great amount of patience. Asking the same questions in different ways again and again is an art that has to be learnt.

Many farms of the farmowners are managed by more than one family.

Usually the head of one of the families could explain the situation of the whole farm. At such farms cultivation is done communally. The harvest is divided according to the shares of the different families in the farm. The questioning of the farmowners was more difficult than the interview of the tenants because the former have their own land. More time had to be made available to convince them that nothing of taxes or the like was involved. It was especially hard to get correct figures of crop yield and several checking questions had to be put.

Since women are not allowed to take part in a discussion with men, and certainly not when strangers are present, the interviewing was confined to the men only.

Occasionally the inventory of a farm was examined. In this way a distinction between poor and well-to-do farmers could be made before any question was asked.

It was always necessary to inquire whether the farmowners worked only at their own farms or occasionally for a landlord, because otherwise the farmer would not mention it.

A number of farmers was interrogated on their food intake and dietary habits. Before starting this investigation, some knowledge about these subjects had to be acquired. Some farmers gave information about the diet of a day, others on the diet of a week, and others on the diet of a year. In relation with the production cycles at the farm considerable differences between the winter and the summer food intake exist. Special attention has to be paid not only to the members of the family but also to the number and age of consumers within one household.

2.4. THE ANALYSIS OF THE FACTS

An economic survey is not finished when the data have only been catalogued. They also have to be analyzed. Therefore three preliminary steps were taken: editing, classifying and coding and tabulating the data.

Editing involves a control of the data to be tabulated seeing to it that they are:

- a. accurate and reliable;
- b. consistent with other facts secured;
- c. uniformly entered;
- d. as complete as possible in connection with the purpose of the survey;
- e. acceptable for tabulation;
- f. arranged so as to facilitate coding and tabulating (37).

The conclusion from a survey depends largely on a comprehensive and sound classification of all facts assembled.

Coding constitutes another step in tabulation and consists of assigning a number or symbol to each category of answer. Coding was done in the office, which is the normal procedure (37). In the selection of codes it should be taken into consideration, whether hand tabulation or machine tabulation is to be used. When machine tabulation can be used, contact with the machine operators is extremely useful, because they can give advice as to how the data should be coded.

Tabulation is the summarization of results in the form of statistical tables (21) (25). The advantage of tabulating data by statistical methods lies in the clarity and precision, with which numerical data are presented. Quantitative figure analyses of economic situations are usually more convincing than the qualitative approach, and are capable of comparison with the findings of other studies. Moreover, statistical tables save space by reducing explanatory and descriptive statements to a minimum, facilitate the process of comparison and usual presentation in the form of relations, make it easier to remember data, again facilitate the summary of items and the detection of errors and omissions, and finally provide a basis for computations (41).

But the life and the problems of the farmers must be studied by a combination of a number of methods and not by relying on the statistical approach only. Therefore non-quantitative descriptions were fully utilized as well.

2.5. NUMBERS OF LANDOWNERS, TENANTS AND FARMOWNERS INTERVIEWED IN THE HILLA-DIWANIYA AREA

In the final tabulations the records of the following families have been used:

- 26 landowners with holdings $> 4,000$ mesharas
- 197 tenants of landowners with holdings $> 4,000$ mesharas
- 61 landowners with holdings $< 4,000$ mesharas
- 179 tenants of landowners with holdings $< 4,000$ mesharas
- 236 farmowners
- 16 villages of communal farmers
- 71 communal farmers
- 66 farmers of the date-palm area.

In addition a more detailed survey with regard to food intake of 195 farm-owners and tenants was made.

CHAPTER 3

SOME ASPECTS OF THE CLASSIFICATION OF THE AREAS

3.1. GENERAL

In order to be able to make a stratified sampling a classification of the area is indispensable. Such a classification, however, is highly determined by the nature of the study. In our study economical differences should clearly be shown.

During the initial field study it appeared that the social and economic structure of the agricultural population of the areas was extraordinarily homogeneous. All farmers were Moslems and a classification into religious classes did not have to be considered. Neither the health situation nor the level of education showed material differences. Since superficially no differences could be discovered the areas were classified according to two criteria:

1. type of farming,
2. type of land tenure.

In the area in Iran a dry farming and an irrigated farming area could clearly be distinguished, while in the area in Iraq, where all farming is irrigated, an area used for annual crops and an area mainly planted with date-palms could be distinguished. By means of the aerial photographs the boundaries of these areas could be traced accurately.

The regions of the agricultural patterns were further subdivided into types of land tenure. In the Middle East the type of land tenure is very important in view of the size of the farm and hence the economics of the farm. Both in Iran and Iraq the tenure of land is based on different rights (33) (48).

3.2. THE CLASSIFICATION OF THE DEZ AREA

In the Dez area in Iran practically all farmland is mulk land controlled by landlords. Part of the area is miri land, part of which is exploited by a development company and part by the government with tenants. The tenants employed on land managed by the government are working on the same terms as the tenants under the landlords. The waqf lands are of little importance consisting of only a small part of the fields of one village and a small area south of the town of Dezful.

Although all ownerrights in the Dez area are registered, no cadastral maps are drawn up. The government and some pretended owners still dispute the rights of some parts of the area. However, in fact, also the disputed areas are managed by the landowners and they have the usufruct of it.

Most mulk land is owned by a group of persons as one body, each person having a given share in the produce of the land. It is common practice to divide the output of land (in many cases the fields which belong to one village) into 24 equal shares (popularly called 'peas'), which are sometimes subdivided into 24 shares each ('barley') while the subdivision may even be repeated in the same manner once again ('sesame').

As an example the division of a village is given below:

| Owner | Shares | | |
|-------|--------|--------|----------------|
| | Peas | Barley | Sesame |
| A | 12 | — | — |
| B | 5 | 10 | 16 |
| C | — | 13 | 8 |
| D | 2 | — | — |
| E | 2 | — | — |
| F | 2 | — | — |
| Total | 23 | + 23 | + 24 = 24 peas |

Owner A may own 12/24 or 1/2 of this village. Owner B and C between them own 6 peas or 1/4 of the village. The rest of the owners own 2/24 of the village each. In fact the land of the village is not divided, only the rent as a part of the harvest accruing to the landowners will be divided in accordance with the shares of the landowners. These shares are saleable.

The relation between landownership and the irrigation system proved further

to be very close. Probably as a result of this close relationship between land and water, ownership is based on a given property of land with the irrigation water as one non-separable unit.

To classify the tenure rights in the Dez area the owners pattern of every village had to be examined or – and this is much easier – the owners of the irrigation feeders had to be found. For, every owner or group of owners own their own canal. The aerial mosaics made it possible to determine the irrigation districts and the boundaries of the fields that belong to one village. As the share in the maintenance of the irrigation canal is moreover closely related to the share in the ownership, a conception though it be general of the owners-pattern could already be made at the beginning of the survey.

Somewhat arbitrarily it was decided to classify landowners with more than four villages among powerful landowners, landowners with one to four villages among middle class landowners, while landowners with one or only part of one village were classified among small landlords and peasant landowners. On the basis of these three groups the area was classified as is shown in figure 3.1.

3.3. THE CLASSIFICATION OF THE HILLA-DIWANIYA AREA

During the initial field survey it appeared that there exists a strong relation between the type of human settlements and the type of land tenure. Therefore these settlements in Iraq were studied extensively before a classification into regions of land tenure was decided upon. During this survey the aerial photographs proved to be extremely useful (cf. photographs 3.2¹⁾ and 3.3²⁾).

3.3.1. *Types of human settlements*

In the area different types of settlements could be found, the economical and social meaning of which are determined by the function which they have with respect to agriculture and the population of the area.

In the area of Iraq it was possible to distinguish the following types of settlements according to their importance:

- a. large urban settlements;
- b. local market settlements;
- c. villages of the tenants;
- d. rural settlements of farmowners;
- e. camps of nomads.

The large urban settlements

The large urban settlements are represented by the towns of Hilla situated in the north west of the area along the Hilla canal, and Diwaniya situated in the south along the Diwaniya canal (cf. figure 4.2). Besides having administrative functions these towns play an important part economically and commercially.

Next to the old city quarter (photograph 3.2) a more modern part was found. The centre of the old quarter is the 'bazar' (market), where many small shopkeepers and artisans carry on their trades. Nowadays the bazar no longer lies in the middle of the centre, which is due to the vast extension of these towns. Adjacent to the old Turkish two-floor houses in the old quarter, a great number

¹⁾ and ²⁾: these photographs are represented after the appendix.

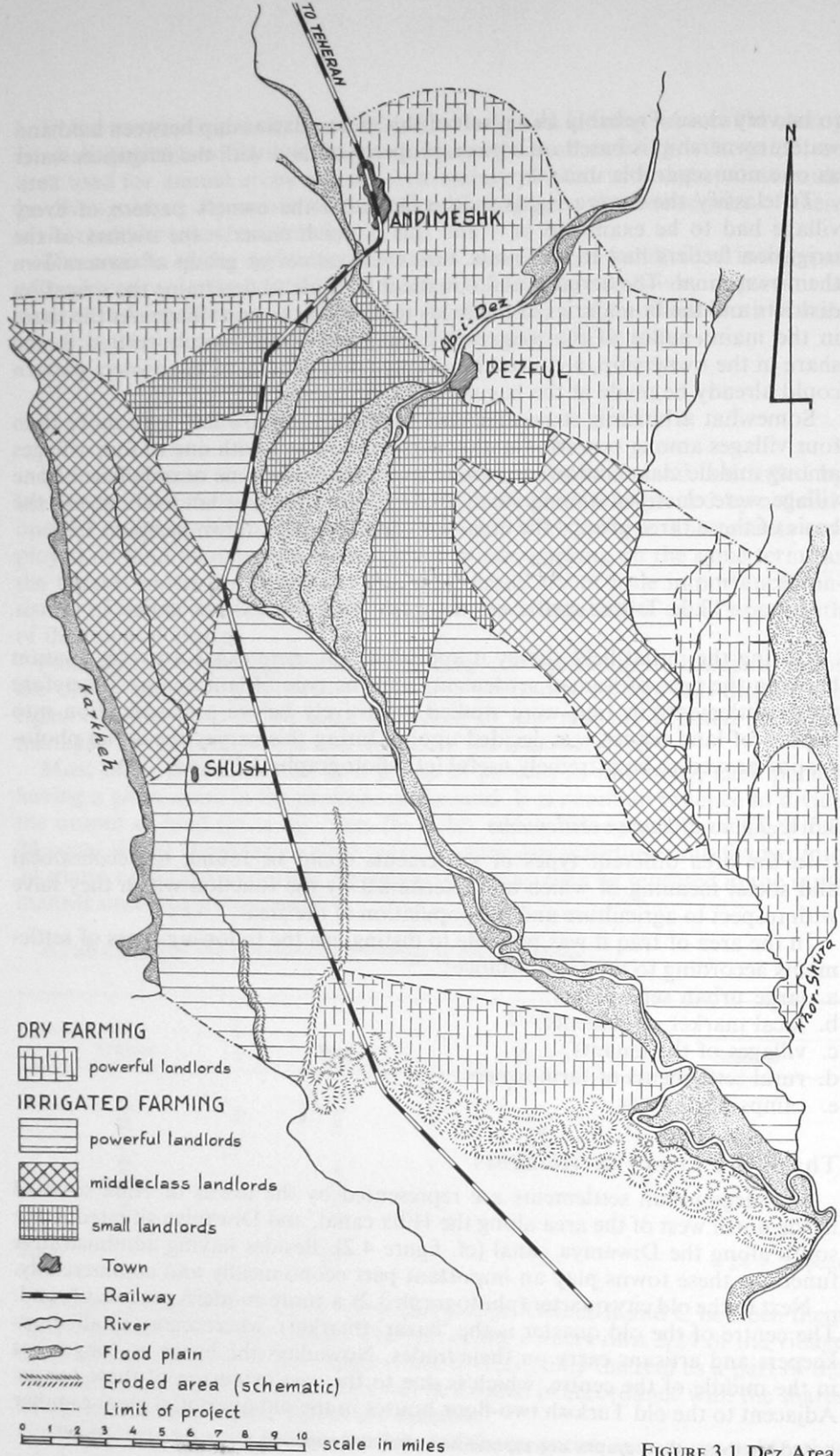


FIGURE 3.1 Dez Area

of small houses is found in narrow streets, where many tearooms, chop-houses and old mosques give the town a picturesque aspect. In the modern quarters the shopping streets, the offices, the firms, the schools, the hospitals and the residential quarter of the wealthy Arabs and Europeans are situated. Beautiful parks, cinemas and clubs stress the western appearance of these quarters. In the course of the years the important governmental, military and police officers have established their offices here, while the less important governmental offices reside in the old quarters. In the outskirts of the towns there are numerous small abodes lodging the labourers and part-time labourers. Most of the town roads are metalled. Practically all stone houses are provided with running water and electricity.

The situation of the large settlements along the big feeders has of old been based on their primary functions: the import of foodstuffs, other necessities of life and fancy goods for the townspeople, and the trading and export of the agricultural surpluses from the hinterland. Therefore many transport companies and stores are located in these towns and tea-houses play an important part.

The economy of the large settlements is principally based on the agricultural environment, while industrial activities still play a minor role.

The towns of Hilla and Diwaniya are connected by an excellent metalled road, which leads further to the north to the capital of the country, Baghdad. A railway line connects these towns with Baghdad in the north and with the port of Basra in the south. An intensive traffic of cars (mainly taxis), trucks and coaches is characteristic of these towns. High governmental officials, doctors, landowners, lawyers, merchants and a large number of retail traders, shopkeepers, traders, artisans, clerks and labourers are the inhabitants of these towns.

The farmers, most of whom do not live in these large settlements, regularly come here to do their shopping and business, and give these towns a touch of excitement and activity.

The local market settlements

The market settlements (Hashemiya, Qasim, Madhatiya, Shjair, Al Bdair, Ifaq, Daghhara and Shomeli) are found scattered over the area (cf. photograph 3.3). These local market settlements primarily serve as markets for the first necessities of life of the farmers and as the places where the agricultural produce is stored and sold. They are also the collecting places where the farmers meet.

Besides a small 'bazar' mainly for the sale of foodstuffs, a government post, a police station, one or more country schools and a dispensary are usually found in these market places. A small number of artisans exercise their trades.

In the middle of these settlements the houses are usually built of stone, while outside the centres part-time labourers and farmers live in mud huts.

Some of these market settlements are situated along the Hilla-Diwaniya highway, while the others scattered over the country are connected by tracks, which during the greater part of the winter season are impassable for cars. Only a few roads in the market settlements are metalled. Most of the market places are provided with drinking-water but electricity is lacking.

The villages of the tenants

The typical human settlements of the tenants are the villages (cf. photograph

3.3). Every large holding – dependent on the number of tenants belonging to the landowner – numbers some villages. The villages consist of mud huts (per village seldom more than 50) which are built in rows. They are about $1\frac{1}{2}$ metres high and have a square entrance in one of the side walls. Date-palm or other fruit trees are not found around the villages, because the landlords do not allow the tenants to plant trees. According to the Koran the planting of a tree gives certain rights of ownership.

The villages of the tenants have a distinguished agricultural character. Non-agricultural activities are rarely found. The inhabitants of these villages are tenants only. They cultivate the land of the landowners and pay a share of the crop as rent.

The location of the villages is determined by the course of the irrigation canals and by the system of agriculture practised. The Niren system (cf. 2.3.3) allows the tenants as a group only to cultivate the same piece of land alternatively every other year. Live-stock is grazed on the fallow lands. In order to combine all activities as economically as possible, the farmers live together in villages, the position of which is adapted to the daily needs and work, so that mainly the banks of the canal and the dividing line between fallow land and cultivated land are chosen for dwelling. Since for domestic water provision the villagers are dependent on the irrigation canals, they prefer to have their villages close to them.

In the largest village of a holding the landowner usually lives in a big stone-walled house. This dwelling is mostly situated somewhat outside the village. Quite near it is also found the 'mudhif', a big oval-shaped shed built of reed. The 'mudhif' is the place, where the farmers gather and where the landowner (the tribal chief) receives his guests (cf. photograph 3.3).

The rural settlements of farmowners

Unlike the tenants, the farmowners preferably live on the banks of the rivers or feeders. Scattered along these banks are found numerous separated dwellings surrounded by many date-palm orchards (cf. photograph 3.3). In one dwelling one or more families may live which depends on the number of families that share the farm. Because the farmowners are the legitimate owners of the land and of the trees planted on the land, they live on their own property and are not, like the tenants, concentrated in villages. Their dwellings can be clearly distinguished from the mud huts of the tenants. In a walled space a few mud houses are built, the number of which depends on the number of families that live on the farm. The appearance of these houses differs considerably from that of the mud huts. They are square and bigger and their roofs are strengthened by means of palm sheets and trees (the palm trees grow in abundance especially on the banks of the rivers, because here a constant underground fresh water supply is present). Besides the main entrance, also smaller openings for light and air are built in the walls. The houses of the farmowners have a more permanent character which is quite understandable, since the type of land tenure, the installation of water-lifting devices, if any, and the planting of date trees binds the inhabitants to their places.

The camps of nomads

In spring scattered camps of tents will be found in the fields. These tents are

the dwellings of the nomads, who settle with their camels in the area for some months. The tents are simple of construction and they are made of goats' hair. The nomads invade the area only when the fallow lands provide an abundance of food for their animals. The nomads form no part of the agricultural population and the contact between the farmers and the nomads is only incidental. The nomads are allowed to graze their camels in the area, because their camels transport cereals and other agricultural produce for the farmers.

3.3.2. *The agricultural regions*

Based on the results of the study of the human settlements, the classification of the area into landownership pattern in Iraq was simple, moreover because here cadastral maps were available. The cadastral maps showed what parts of the area were owned by landowners and what parts are owned by farmers. The large blocks on the cadastral map stand for big landownership, while the smaller blocks represent the areas occupied by farmowners.

The subdivision of the area of the landowners was based on the data of the water duty provided by the Irrigation Service. The landowners with more than 4,000 mesharas received 1 m³/sec. per 11,000 mesharas, while the landowners with less than 4,000 mesharas received 1 m³/sec. per 12,000 mesharas.

The farms of the farmowners could be classified into:

- a. individual farms.
- b. communal farms.

The Hilla-Diwaniya area, comprising 1,230,200 mesharas, was accordingly divided into six regions, which primarily differ with regard to the predominant form of landownership, the description of which follows here:

Region 1: Large holding areas.

Region 1 comprises those areas which were controlled by large landlords. By large holdings are meant areas of 4,000 mesharas or more, which were until recently controlled by sheiks or landlords. These lands were cultivated by tenants on a share-cropping basis.

Region 2: Medium holding areas.

To this category belonged those areas which were likewise controlled by landlords, who exploited them on a share-cropping basis with tenants, but whose property did not exceed 4,000 mesharas.

Region 3: Farmowner areas.

These areas are occupied by farmowners cultivating their own lands. It frequently happens that several families own and farm one holding.

Region 4: Areas with communal farms.

In the south of the area also the farmowners live in villages. In these villages the system of communal landownership is still in practice. Under this system the village land is owned by the community consisting of a number of families; the land is not divided in any sense. Periodically – usually every two years – the elders of the village re-allot the land in satisfaction of the shares in accordance with the crop rotation. Under this system no cultivator permanently cultivates the same piece of land.

Regions 5 and 6: Date-palm areas.

In this region, where cultivation is mainly confined to date-palms, both farmowners (Region 5) and tenants of large date-palm orchards (Region 6) are found.

The various regions are shown in figure 3.4.

It is noteworthy that the estates of the great landowners are furthest removed from the big rivers. The farmowners live closest to the rivers.

CHAPTER 4

COMPILATION OF THE DATA OF THE AGRO-ECONOMIC SURVEY OF THE HILLA-DIWANIYA AREA

4.1. GENERAL INFORMATION ABOUT THE AREA

The Hilla-Diwaniya area comprises approximately 1,230,000 mesharas and forms part of the Mesopotamian plain between the Euphrates and the Tigris (cf. figure 4.1). The area is situated within the following boundaries: the Babil canal, the sand dunes and the desert to the north east and east, the Shamiya Eastern drain, the Hor Ibn Najim and the area not yet served by the present irrigation system to the south and a ridge running parallel east of the Hilla Kefil highway to the west.

The climate in South Iraq is arid with a rainfall of about 120 mm per year and an average low air humidity. The average temperature is lowest in January, being 10.0°C, and highest in August, being 33.3°C. The mean maximum temperature in August is very high, viz. 42.9°C. The rainy season is from November till May and the rain mostly falls in light showers.

The soil of the area is built up of fluviatile sediments which were deposited during the whole Quaternary period. The fertility of the soil is low. On the whole the flat area slopes to the south and south east and shows here and there elevations, which came into being naturally or artificially, namely sand and clay dunes, 'Argubs' i.e. sediments excavated regularly from the canal bottoms which cause the formation of large banks along canals, and 'Tells' i.e. hills formed as a result of long periods of continuous habitation. The average slope of the area is 12 cm/km, providing a favourable topographical situation for irrigation and drainage.

4.2. GENERAL INFORMATION REGARDING GOVERNMENTAL ADMINISTRATION

4.2.1. *Administrative divisions*

Iraq is divided into 14 Liwas (provinces) each governed by a Mutasarrif (Governor General). The Liwa is subdivided into Qadhas (districts) administered by Qaimaqans (Governors) and the Qadha is further subdivided into Nahias (sub districts) administered by Mudirs. The Mudir is responsible to the Qaimaqan who, in his turn, is responsible to the Mutasarrif. If, however, the Nahia is situated near the capital of the Liwa, the Mudir is directly responsible to the Mutasarrif.

The Hilla-Diwaniya area comprises part of the Liwa of Hilla to the north and part of the Liwa of Diwaniya to the south. The Hilla part of the area consists of the Nahias of Hilla, Madhatiya, Qasim, a small part of Kefil and that part of Mahawil that lies to the south of the Babil canal. The Nahias of Madhatiya and Qasim together form the Qadha of Hashemiya. The Mudir of

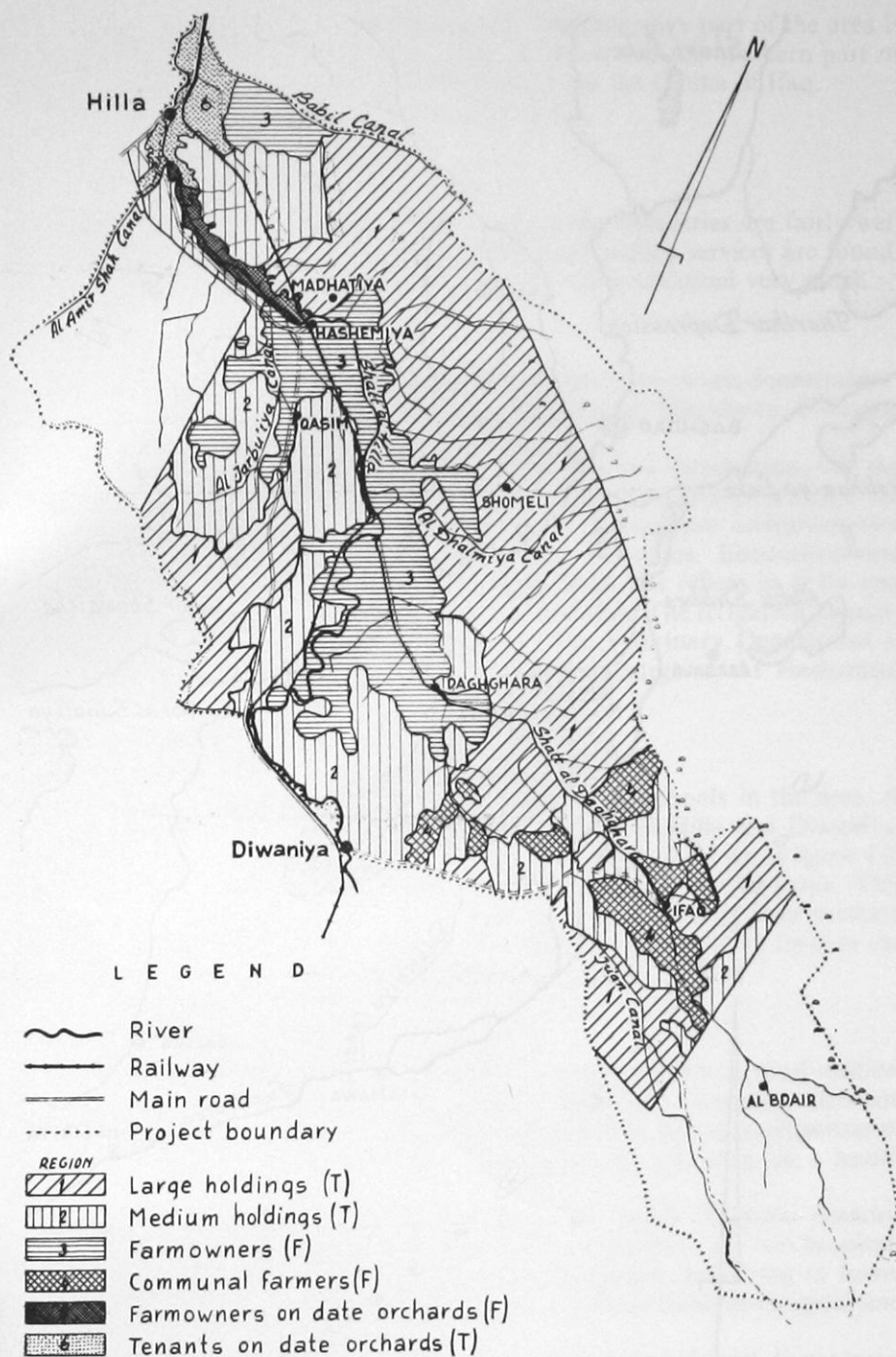


FIGURE 3.4 Hilla-Diwaniya Area
(Agricultural regions)

0 5 10 15 scale in miles.

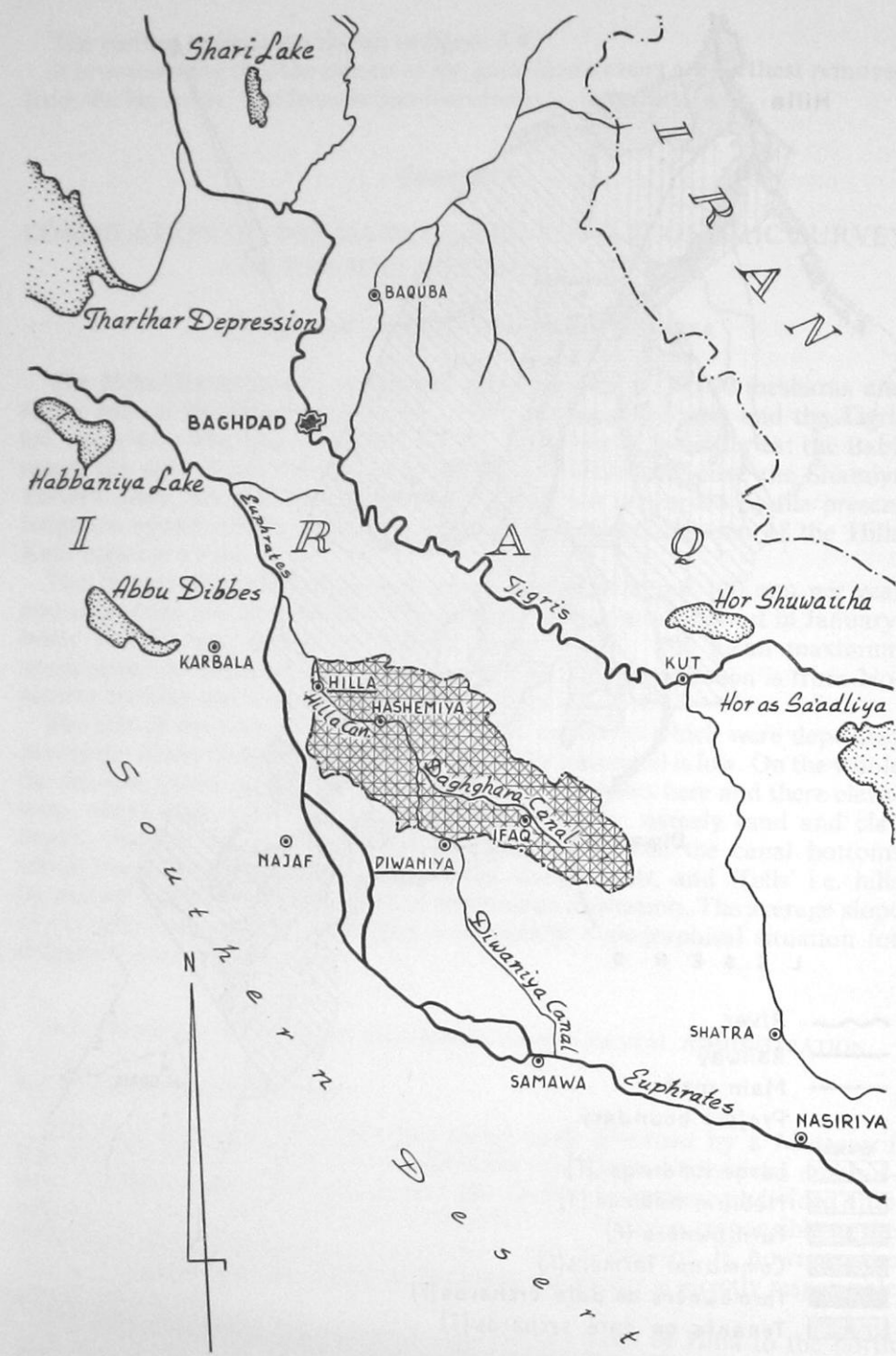


FIGURE 4.1 Hilla-Diwaniya Area
(Geographic position of the area in Iraq)

Meded. Landbouwhogeschool, Wageningen **62** (1), 1-99 (1962)

Hilla is directly responsible to the Mutasarrif. The Diwaniya part of the area is made up of the Nahias of Daghhara, Ifaq, Al Bdair and the northern part of Seniya. Daghhara, Ifaq and Al Bdair together form the Qadha of Ifaq.

The administrative division is shown in figure 4.2.

4.2.2. Government services

Although in the capitals of the Liwas most of the Ministries are fairly well represented, in the Qadhas and Nahias highly understaffed services are found. The organization of government departments is still centralized very much.

Agricultural services

The Ministry of Agriculture in Baghdad is divided into seven departments: Agriculture, Irrigation, Cadastral Surveys, Agricultural Machinery, Forestry, Land Reform, and Veterinary.

The Department of Agriculture is sub-divided into two directorates, viz. the Directorate for Research and Projects (mainly situated in Abu Graib) and the Directorate of Agriculture. The Directorate of Agriculture comprises five branches: Plant Protection, Extension Service, Nurseries, Economics and Government Farms. The Department of Agriculture has offices in Hilla and Diwaniya. Sub-offices are found in Hashemiya and Ifaq. The Irrigation Department has field offices in Hilla and Diwaniya. The Veterinary Department is represented in Hilla and Diwaniya by a veterinary surgeon. At Hashemiya and Daghhara are dispensaries.

Education services

The Ministry of Education established a number of schools in the area. A number of inspectors are stationed at the local offices in Hilla and Diwaniya. The distribution of the various kinds of schools in the area is shown in figure 4.3.

There is one agricultural school in the neighbourhood of Diwaniya. This school is meant to give farmers' sons a three-years training after their primary education. It was established in 1958 and is the only school of its kind in the area. It is run by the Ministry of Agriculture.

Health services

The existing health organization in each Liwa is controlled by a chief medical officer. In addition to hospitals in the towns of Hilla and Diwaniya, there are first and second class dispensaries in various villages. The first class dispensaries are run by a doctor, the second class dispensaries are run only by a health officer.

In Hilla there are five hospitals (totalling 264 beds). Thirteen doctors, including specialists, practise in this town. In Diwaniya there are two hospitals with 161 beds and thirteen doctors, including specialists, practising in town. Furthermore, in each of the two capitals there is a State General Hospital and a sanatorium for chest diseases.

Figure 4.3 shows the location and number of the hospitals and dispensaries in the area.

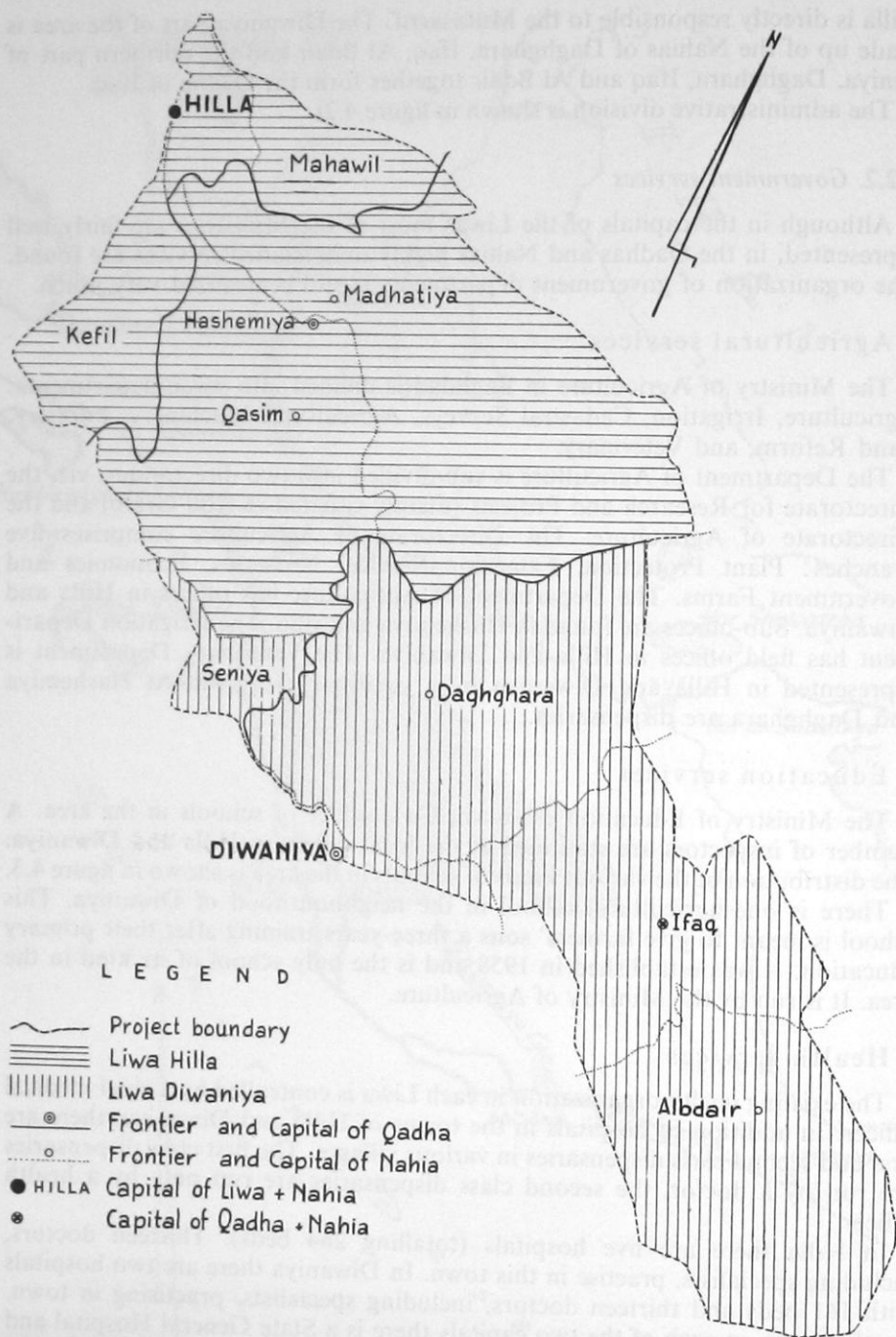


FIGURE 4.2 Hilla-Diwaniya Area
(Administrative division)

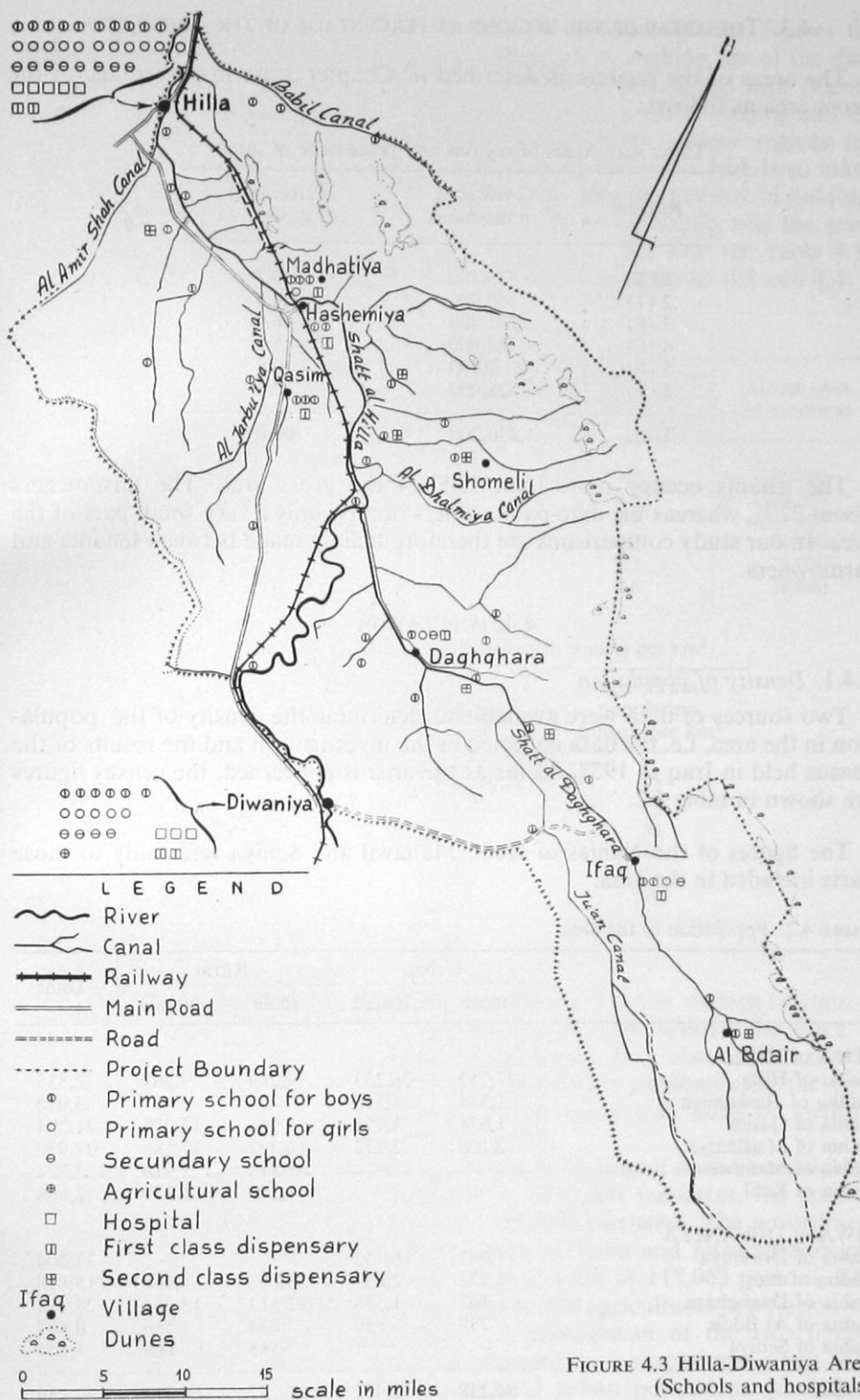


FIGURE 4.3 Hilla-Diwaniya Area
(Schools and hospitals)

4.3. THE AREAS OF THE REGIONS AS PERCENTAGE OF THE GROSS AREA

The areas of the regions as described in Chapter 3 are in percentage of the gross area as follows:

TABLE 4.1. Areas of regions and percentage of total

| Region | Gross area in mesharas | Percentage of gross area |
|--------|---------------------------|-----------------------------|
| 1 (T) | 575,800 | 46.7 |
| 2 (T) | 350,000 | 28.5 |
| 3 (F) | 201,400 | 16.4 |
| 4 (F) | 64,800 | 5.3 |
| 5 (F) | 9,900 | 0.8 |
| 6 (T) | 28,000 | 2.3 |
| Total | 1,230,200 | 100.0 |

The tenants occupy more than 75% of the gross area. The farmowners about 22%, whereas the date-palm owners occupy only a very small part of the area. In our study comparisons are therefore mainly made between tenants and farmowners.

4.4. POPULATION

4.4.1. Density of population

Two sources of data were available to determine the density of the population in the area, i.e. the data collected in the investigation and the results of the census held in Iraq in 1957. As far as the area is concerned, the census figures are shown in table 4.2.

The figures of the Nahias of Kefil, Mahawil and Seniya refer only to those parts included in the area.

TABLE 4.2. Population of the area

| | Urban | | Rural | | Total |
|--------------------|--------|--------|--------|--------|---------|
| | male | female | male | female | |
| LIWA of HILLA | | | | | |
| Nahia of Hilla | 27,752 | 26,253 | 9,289 | 9,261 | 72,555 |
| Qadha of Hashemiya | 1,534 | 1,516 | — | — | 3,050 |
| Nahia of Qasim | 1,671 | 1,791 | 14,906 | 12,926 | 31,294 |
| Nahia of Madhatiya | 2,100 | 2,272 | 16,392 | 17,186 | 37,950 |
| Nahia of Mahawil | — | — | 1,817 | 1,910 | 3,727 |
| Nahia of Kefil | — | — | 1,289 | 1,379 | 2,668 |
| LIWA of DIWANIYA | | | | | |
| Nahia of Diwaniya | 17,062 | 16,142 | — | — | 33,204 |
| Qadha of Ifaq | 1,975 | 2,025 | 5,852 | 5,966 | 15,818 |
| Nahia of Daghhara | 1,407 | 1,558 | 12,513 | 13,434 | 28,912 |
| Nahia of Al Bdair | 737 | 850 | 3,634 | 3,586 | 8,807 |
| Nahia of Seniya | — | — | 585 | 669 | 1,254 |
| Totals | 54,238 | 52,407 | 66,277 | 66,317 | 239,239 |

In order to obtain more detailed information concerning these figures the farming population of the rural area was computed by making use of the data acquired in the investigation. After the area had been classified into regions based on land-ownership (cf. figure 3.4) the size of the average holding and the number of persons per holding were determined for the various regions (cf. table 4.12). As regards the size of the holdings, only farmland had been taken into consideration. The results of the investigation gave the number of holdings per region. This figure in conjunction with the size of the family and the gross area of the region reveals the density of population per km² (cf. table 4.1). The combination of these data resulted into the following tables 4.3 and 4.4:

TABLE 4.3. Size of holdings and family members per holding

| | Farmland in mesharas | Average size of holdings in mesharas | Average number of family mem- bers per holding | Gross area in mesharas |
|--------------|-------------------------|--------------------------------------------|------------------------------------------------------|---------------------------|
| Region 1 (T) | 274,300 | 66 | 5.9 | 575,800 |
| Region 2 (T) | 178,800 | 53 | 6.4 | 350,300 |
| Region 3 (F) | 88,600 | 32 | 6.7 | 201,400 |
| Region 4 (F) | 38,200 | 32 | 6.0 | 64,800 |
| Region 5 (F) | 9,800 | 5 | 7.3 | 9,900 |
| Region 6 (T) | 24,900 | 13 | 7.6 | 28,000 |

TABLE 4.4. Total population and population density per km²

| | Population | Agricultural population density per km ² |
|--------------|------------|-----------------------------------------------------------|
| Region 1 (T) | 24,520 | 17 |
| Region 2 (T) | 21,587 | 25 |
| Region 3 (F) | 18,546 | 36 |
| Region 4 (F) | 7,158 | 44 |
| Region 5 (F) | 14,308 | 571 |
| Region 6 (T) | 14,554 | 210 |
| Total | 100,673 | |

In figure 4.4 the population density is represented for the various regions. It will be clear that there is a strong population pressure around the town of Hilla and in the date-palm area south of this town. It is also notable that in the areas where farmowners (regions 3 (F) and 4 (F)) predominate, the concentration of population is greater than in the areas with large or medium holdings of landowners (regions 1 (T) and 2 (T)).

In comparing these figures with the government findings it must be considered that, while our own inquiry was confined to 1,230,200 mesharas, the government figures refer to a total area of about 1,600,000 mesharas. The government census (excluding the population of the towns of Hilla and Diwaniya) calculated on a basis of 1,230,200 mesharas, gives a result of 117,063 persons. The total reached in our investigation refers only to the agricultural population i.e. persons directly occupied in agriculture. A comparison of the two figures indicates that 16,390 persons must be engaged in occupations other than agricultural occupations. Since the total local urban population (excluding

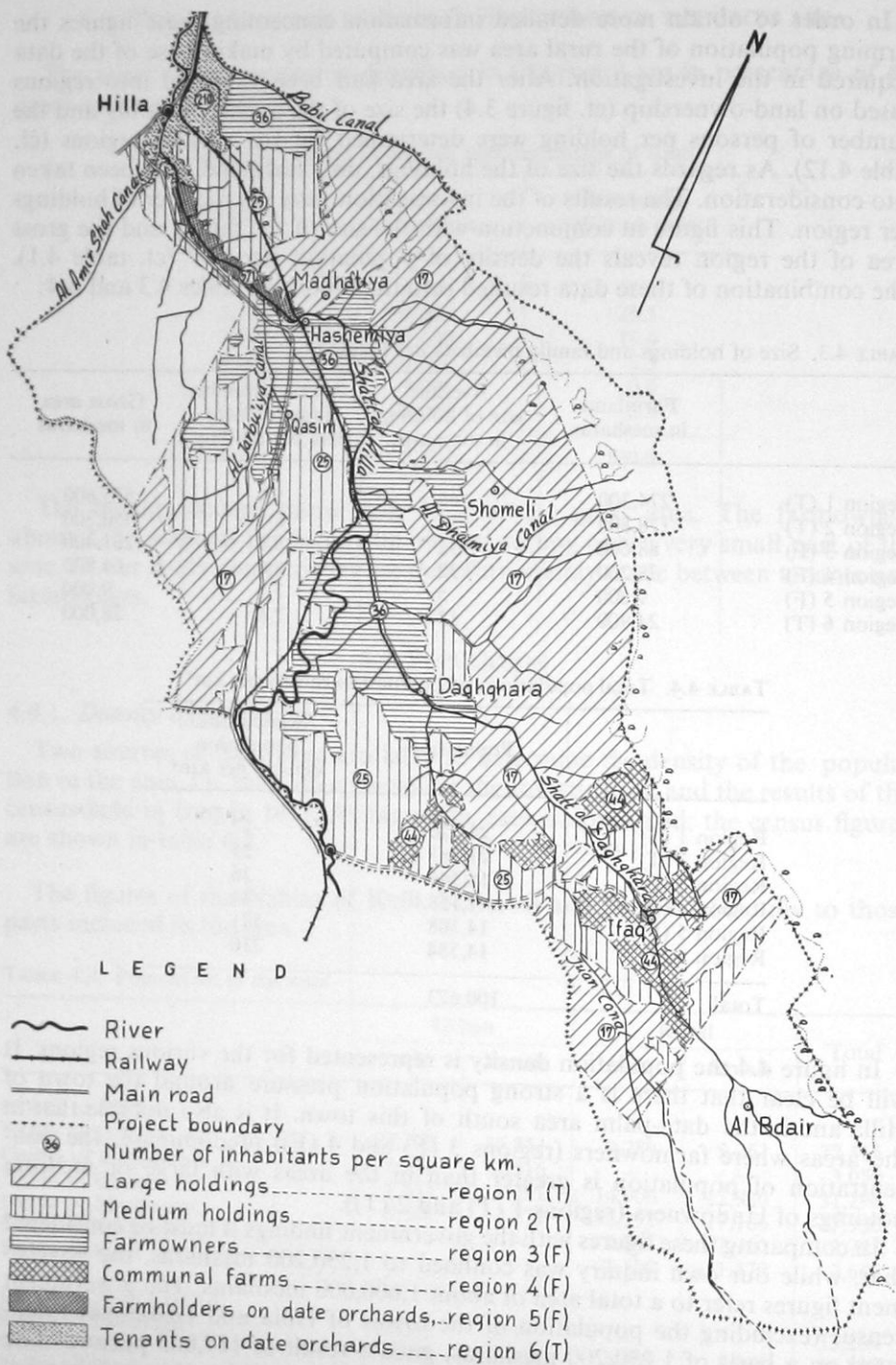


FIGURE 4.4 Hilla-Diwaniya Area
(Population density in agricultural regions)

Hilla and Diwaniya) is 19,436, it may be concluded that in the local market settlements 84.3% of the population is engaged in non-agricultural pursuits. In view of the total population of the rural area only 14% of this total population is engaged in non-agricultural employment, a percentage which seems quite plausible in view of the structure of the area and these small settlements.

4.4.2. Means and level of living

The population of the area lives mainly, directly or indirectly, on the cultivation of the land. The investigation shows that 85% of the population (excluding the towns of Hilla and Diwaniya) depend directly on agriculture. Approximately 62.5% are tenants, while approximately 22.5% are farmowners; 14% are indirectly connected with agriculture and 1% represent additional labour not related to agriculture.

The 14% indirectly connected with agriculture consist of labourers, artisans, shop-keepers and merchants. They live in the small market centres and their trade is fully connected with the agriculture of the surrounding regions.

The industrial activities in the area are not of much importance. But for a few brick-yards, they are principally based on agricultural production. In Hilla, Diwaniya and scattered over the country there are a few flour mills, there is a bit of industry connected with the manufacture of products made of sesame and furthermore there is a production of treacle out of dates which is of some importance economically. These factories (54 in Hilla and 1 in Diwaniya) also produce for export to neighbouring countries. In Hilla there is one small dairy factory producing cream and butter of buffalo milk mainly for hospitals. The craft of the artisans has a great popularity in the market centres and the towns.

Many labourers are seasonal or semi-regular workers. They go to the bigger towns to work in times of low activity in the rural districts, but for the greater part of the year they are dependent on what their own farm produces and on their relatives. Only a very small number of labourers find regular employment in industry.

Only a comparatively small part of the population earn a living by work of a different nature. In this group are classed the landowners, the high government officials, the merchants, the lawyers and the doctors.

Results of the investigation on incomes in the various categories are summarized in the following specified list.

| | Estimated net income per year in ID |
|----------------------|----------------------------------------|
| Tenants | 80 |
| Farmowners | 75 |
| Labourers | 70 |
| Craftsmen | 91 |
| Small merchants | 110 |
| Shopkeepers | 126 |
| Merchants | 150 (min.) 1000 (max.) |
| Government officials | 147 (min.) 500 (max.) |
| Landowners | 0.5-0.8 (per meshara) |

There is a wide deviation of the incomes of farmers, labourers, craftsmen, small merchants and the income of people in professions.

There is serious underemployment amongst the population of the area. In summer there is not enough irrigation water available and consequently only a small part of the area can be cultivated, leaving a number of farmers without work. There are no prospects at the moment to solve the problem of serious underemployment in the area as, apart from agriculture, there is practically no work of any other nature available. There are no ways out in the form of migration to other parts of the country, because also there the alternative means of employment are few or non-existing.

The economic situation of the farmers in the area is maintained on the subsistence level. The people not employed permanently mainly originate in the groups of the tenants. The policy of the landowners was to prevent too strong a minimalization of the size of the farms and this caused a drift off to the marketing centres of that part of the population for whom there is no employment because the birth rate is higher than the death rate.

4.5. LAND USE AND CROPPING PATTERN

In this particular area it has appeared that the economic structure of the farmunit is closely related to the cultural practices and the cropping pattern and consequently the land use. Many actions of the farmers appear in reality to be based on agricultural methods which through the years have undoubtedly proved to be correct under the given conditions and well adapted to their social, economic and natural environment.

The knowledge of land use as interpreted by studying the aerial photographs, where necessary corrected after inquiry in the field, was used as a basis for the analysis of the cropping pattern. As mentioned before (cf. 2.3.3) the Niren system is basically the origin of the crop rotation scheme in the area. The general assumption is that the Niren system:

1. reduces the danger of salinisation in the absence of drainage;
2. recovers the fertility of the land by its overyear fallowing;
3. provides grazing land;
4. combats weeds and provides sufficient time for ploughing.

The irrigation water available is anyhow limited and in fact allows the farmer only to crop no more than half the area every winter. Nevertheless strong salinization of large parts of the area has reduced the acreage of usable land and has affected this rotation system. From the landuse table 4.5 it appears that about 20% of the arable land is cultivated in two successive years. The continually advancing salinization compels many farmers, especially the farm-owners, to return to the same plot every year.

Over 50% of the total area lie idle or waste. From the investigation it appears that 20.9% of that land are too saline to be cropped. For the remaining 29.3% there is either not enough irrigation water available (circa 15% of the area) or its topography is such that it cannot be reached by the irrigation water. Moreover, part of it is used for houses, roads, etc. or on account of other grounds it is permanently useless for agriculture.

In winter mainly wheat and barley are grown, while in summer rice and vegetables are the main crops. The low summer percentage is notable.

TABLE 4.5. Land use of area – percentages of crops

| | Gross area as 100 % (1,230,200 mesharas) | | Farmland as 100 % (612,600 mesharas) | | Farmland in 1,000 mesharas |
|---------------------------|---------------------------------------------|-------|-----------------------------------------|-------|-------------------------------|
| | Winter | | | | |
| Waste and idle lands | | 50.2 | | — | |
| Fallow | 20.4 | 20.4 | 40.9 | 40.9 | 251.1 |
| Wheat | 6.8 | 24.2 | 13.7 | 48.5 | 84.1 |
| Barley | 17.4 | | 34.8 | | 213.5 |
| Barley ¹⁾ | (0.3) | | (0.6) | | (3.8) |
| Broad beans ³⁾ | (0.1) | | (0.3) | | (1.7) |
| Vegetables | 0.6 | | 1.3 | | 2.5 |
| Vegetables ¹⁾ | (0.1) | | (0.1) | | 6.4 |
| Cotton | 0.2 | (0.5) | 0.4 | (1.0) | (1.0) |
| Alfalfa | 0.0 | | 0.1 | | 0.6 |
| Millet | 0.0 | | 0.1 | | 0.7 |
| Pasture ²⁾ | 2.2 | | 4.5 | | 27.6 |
| Orchards (mainly dates) | 2.1 | | 2.1 | | 4.2 |
| | | | | | 613.7 |
| | Summer | | | | |
| Waste and idle lands | | 50.2 | | — | |
| Fallow | 43.6 | 43.6 | 87.2 | 87.2 | 536.0 |
| Rice | 2.3 | | 4.7 | | 28.9 |
| Sesame | 0.6 | | 1.2 | | 7.0 |
| Vegetables | 0.7 | | 1.3 | | 8.1 |
| Vegetables ¹⁾ | (0.0) | 4.2 | (0.1) | 8.6 | (1.0) |
| Cotton | 0.2 | | 0.4 | | 2.5 |
| Greengram | 0.1 | | 0.2 | | (0.1) |
| Millet | 0.1 | | 0.3 | | 1.7 |
| Sorghum | 0.1 | | 0.3 | | 1.3 |
| Alfalfa | 0.1 | | 0.2 | | 0.6 |
| Orchards | 2.1 | 2.1 | 4.2 | 4.2 | 26.2 |
| | | | | | 613.6 |

¹⁾ These crops are planted under date palms.

²⁾ By pasture are understood those fallow lands which are especially irrigated for pasture.

³⁾ Broad beans are always interplanted with barley or wheat.

As table 4.6 may show there is a wide difference among the various regions as regards landuse. The main differences are found in the percentage of idle and waste land, the orchards and the land fallow in winter.

In region 1 (T) (where the land was wholly in hands of powerful landowners) a more or less pure Niren system was observed. In region 2 (T) 20% and in region 3 (F) almost 32% of the land was cultivated in successive years. The figures of the various regions show that the fallow land of the arable land is far less than 50% in region 3 (F), 5 (F) and 6 (T). In these regions the land is predominantly in hands of farmowners. Obviously the greater pressure of population and the decrease of arable land as a result of salinization impel the farmers in region 3 (F) to a more intensive system of cultivation.

TABLE 4.6. Land use by region

| Regions | 1 (T) | 2 (T) | 3 (F) | 4 (F) | 5 (F) | 6 (T) |
|-------------------------------|---------------------------------|-------|-------|-------|-----------|------------|
| | Percentage of gross area | | | | | |
| Waste and idle land | 52.4 | 49.0 | 56.5 | 41.4 | 1.5 | 11.1 |
| Farmland | 47.6 | 51.0 | 43.5 | 58.6 | 98.5 | 88.9 |
| | Percentage of farmland (Winter) | | | | | |
| Fallow | 49.1 | 39.0 | 31.2 | 36.3 | 1.1 | 20.4 |
| Wheat | 14.2 | 14.9 | 9.9 | 25.2 | (21.0) | 3.7 |
| Barley | 30.2 | 38.2 | 47.1 | 32.8 | 8.8 | 30.1 (6.8) |
| Other winter crops | 1.7 | 1.4 | 2.7 | 0.5 | 2.0 (3.3) | 4.6 (6.5) |
| Pasture | 4.4 | 5.5 | 4.7 | 3.9 | — | — |
| Orchard (dates) | 0.4 | 1.0 | 4.4 | 1.0 | 88.1 | 41.2 |
| | Same (Summer) | | | | | |
| Fallow | 93.3 | 87.4 | 85.1 | 90.2 | 9.3 | 54.2 |
| Rice | 3.6 | 5.9 | 8.5 | 4.2 | — | — |
| Vegetables | 0.3 | 1.6 | 0.6 | 0.9 | 1.7 (3.3) | 2.6 (2.8) |
| Other summer crops | 1.4 | 4.1 | 1.4 | 2.7 | 0.9 | 2.0 |
| Orchard (dates) | 0.4 | 1.0 | 4.4 | 1.0 | 88.1 | 42.1 |
| Rotation factor ¹⁾ | 0.58 | 0.74 | 0.84 | 0.74 | 1.02 | 0.84 |

¹⁾ The rotation factor R is an index of the intensity of land use.

$$R = \frac{\text{mesharas crop harvested per year}}{\text{gross mesharas farmland}}$$

() interplanted crops

Although the price of wheat is twice that of barley (cf. 4.11.2) the farmers prefer barley. It is generally assumed that wheat requires a higher fertility of the soil and that it is less salt resistant than barley. Thirty years ago the southern part of the area was again brought under the plough after ages of being fallow and obviously the proportion of nutritive salts is here still at a satisfactory level. From the inquiry it appeared that in the whole area barley was preferred because in addition to low fertility and salinity of the soil also barley can be utilized more profitable as fodder on a farmer's holding (cattle provide for the main net income of the tenants cf. 4.11.4).

The cultivation of summer crops is largely dependent on the quantity of water available. Therefore in the northern part of the area a relatively high percentage of land under rice and vegetables is found, whereas in the southern part at the tail of the irrigation system millet, sorghum and greengram, being more drought resistant, can be found.

The rather high acreage of vegetables in the regions 5 (F) and 6 (T) is possible because of the thickly populated Hilla area, which makes it possible to

market the surplus over home consumption. The orchards are principally concentrated in these regions, but are also found in region 3 (F) along the rivers or big irrigation canals. As date-palms require a soil of good permeability they are planted on the higher banks of the river which consist of more sandy soil. Many of these orchards, however, consist of young plantations (cf. 4.6).

The time table for the crops planted in the area is reproduced in figure 4.5. This figure shows that wheat, barley and broad beans are winter crops and that rice (planted after winter crop), sesame and millet (normally planted), sorghum and greengram are summer crops. Alfalfa remains in the field for the whole year, while cotton has a growing period of nine months. Along the Hor Ibin Najim paddy is grown earlier in summer in fields which are served by the tides of the lake. Late millet is chiefly cultivated in the southern part.

As regards vegetables, a distinction must be made between:

1. Summer vegetables: water melons and long cucumbers.
2. Winter vegetables: tomatoes, cucumbers, onions (grown from seed), garlic, radishes, turnips and beet.
3. Spring vegetables: tomatoes, cucumbers, onions, lady's fingers and egg plants.
4. Autumn vegetables: lettuce.

Broad beans are always sown among wheat or barley. A small part of the fallow land is purposely irrigated in winter and summer, in order to obtain a growth of grass for grazing. The extent of this area is strongly dependent on the rainfall. The winter rains are normally able to bring about a fairly adequate growth of grass and weeds on practically all the fallow lands. If these rains come late, limited areas are irrigated.

To be able to show the cropping pattern prevailing in the various regions in simple figures, the occurrence of crops in winter and summer is expressed in percentages of the total farm area for each season (the acreage of each season is taken as 100% cf. 2.3.3).

Figure 4.6 shows for every region the winter and summer pattern stating the percentages actually found. This figure clearly indicates that the areas planted with summer- and winter crops increase from region 1 (T) to region 3 (F). The same holds good for the area with date-palms. It also shows the varied composition of the summer pattern, in which in addition to rice, sesame and vegetables, also millet, sorghum and greengram take their place, be it a modest one. Figure 4.7. demonstrates that for the increasing intensity of the winter crops, a part of the fallow lands rotating in the Niren system had to be sacrificed. The increasing intensity of the landuse is also expressed in the cultivation methods followed for the summer crops cotton and vegetables. Cotton, in region 1 (T) and 2 (T), is grown in a normal 3 year rotation. In region 3 (F), however, cotton is planted in the same field as a ratoon crop every year. Naturally, this method of cotton growing is far from ideal. Shortage of suitable land, however, forces the farmowner to make use of such contrivances. For the same reasons in regions 2 (T) and 3 (F), vegetables are also planted on the same plot every year. An attempt is made to maintain the yield level of the crops by using mound earth from the many 'tapeh's' found in the region as manure.

However, it has to be stated that the various cultivation systems are shown here schematically, in practice many variations are applied.

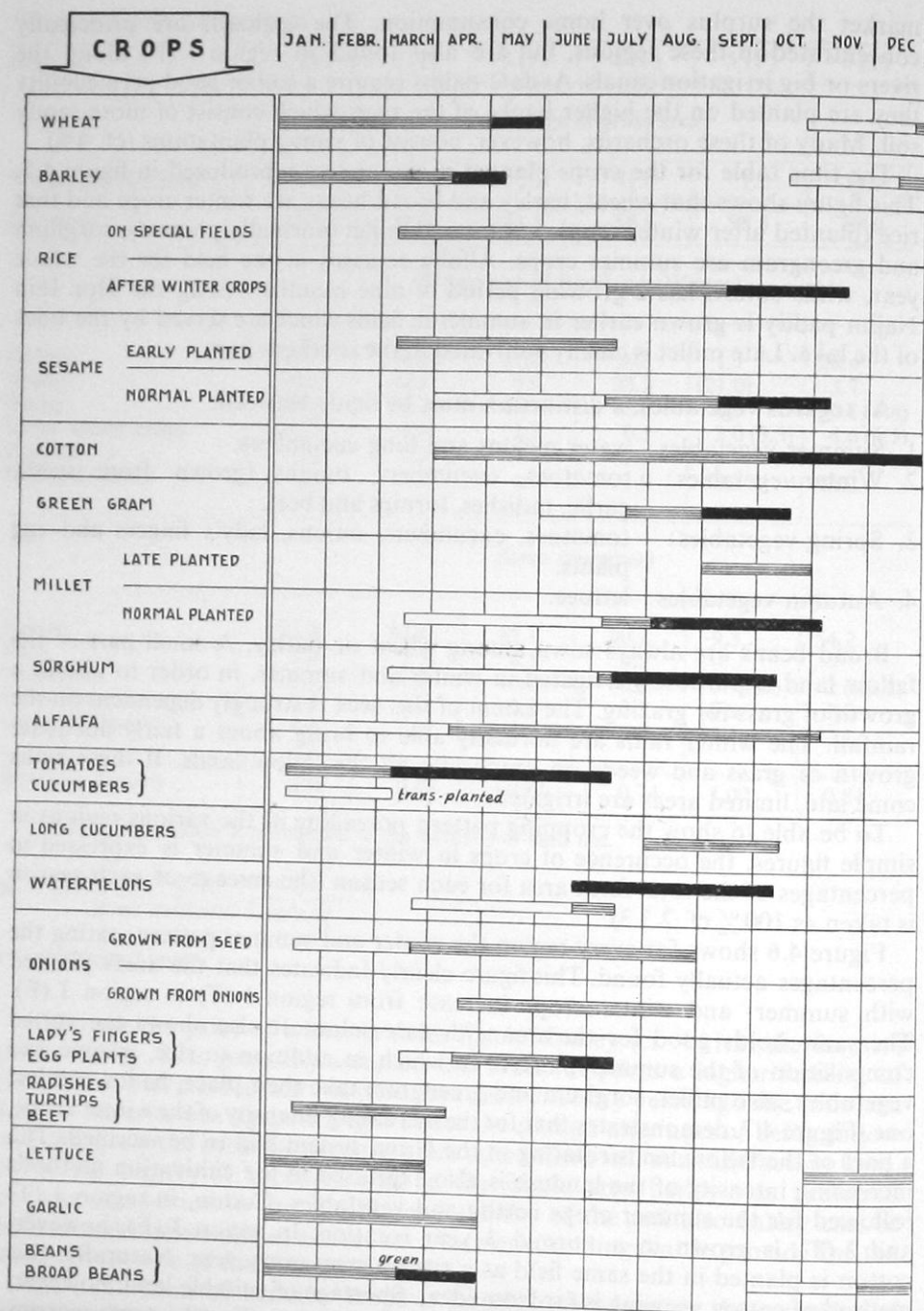
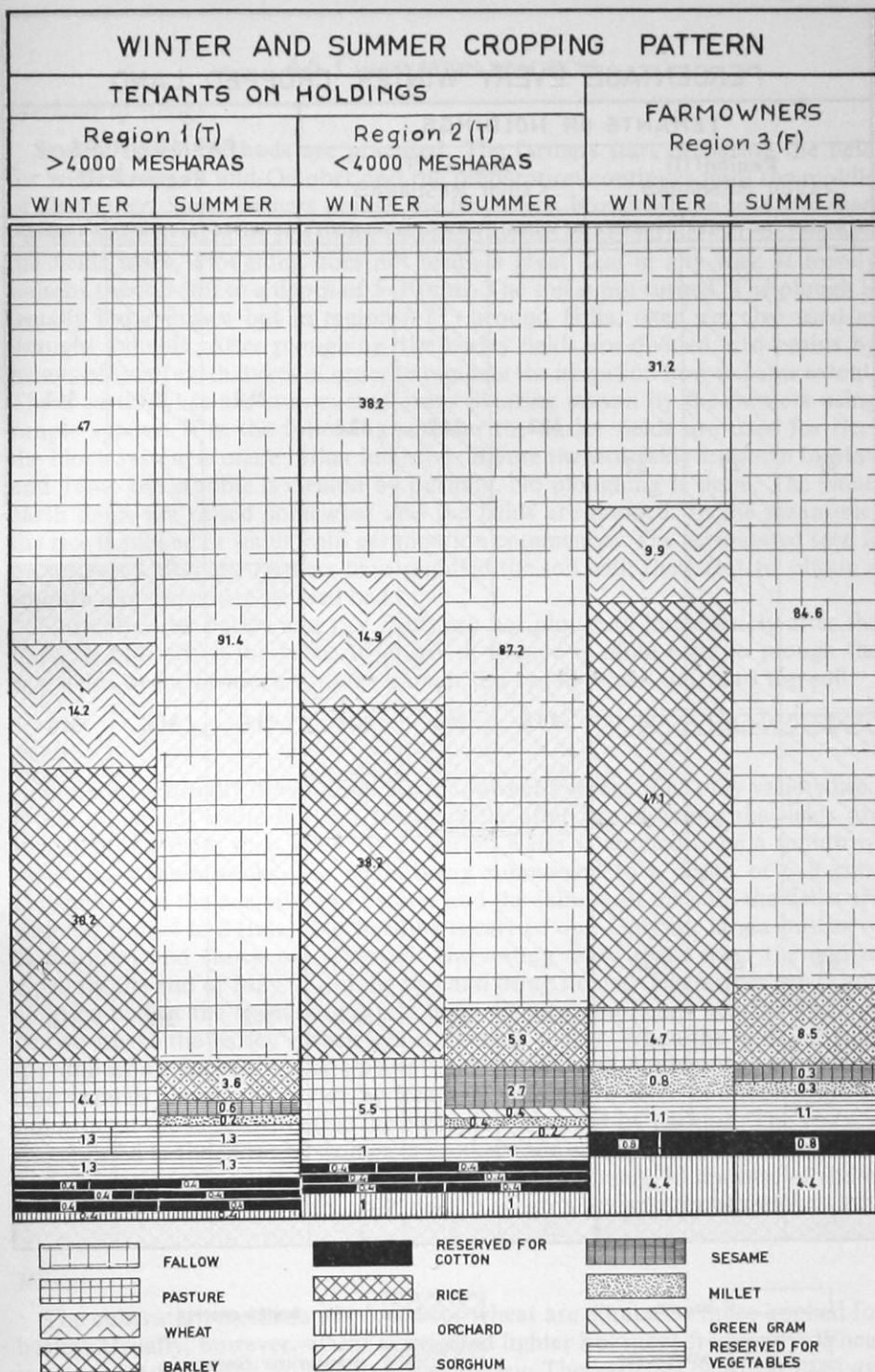


FIGURE 4.5 Growing period crops.

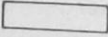



47 = LANDUSE IN PERCENTS


FIGURE 4.6 Cropping pattern


PERCENTAGE EVERY WINTER CROPPED LAND.

| TENANTS ON HOLDINGS | | | | | | | | | FARMOWNERS | | |
|---------------------------------|------------|------------|---------------------------------|------------|------------|--------------|------------|------------|------------|------------|------------|
| Region 1 (T) >4000 MESCHARAS | | | Region 2 (T) <4000 MESCHARAS | | | Region 3 (F) | | | | | |
| 1st WINTER | 2nd WINTER | 3rd WINTER | 1st WINTER | 2nd WINTER | 3rd WINTER | 1st WINTER | 2nd WINTER | 3rd WINTER | 1st WINTER | 2nd WINTER | 3rd WINTER |
| 47 | 47 | 47 | 38.2 | 38.2 | 38.2 | 31.2 | 31.2 | 31.2 | | | |
| 2 | 2 | 2 | 20.6 | 20.6 | 20.6 | 31.6 | 31.6 | 31.6 | | | |
| 47 | 47 | 47 | 38.2 | 38.2 | 38.2 | 31.2 | 31.2 | 31.2 | | | |
| 4 | 4 | 4 | 3 | 3 | 3 | 6 | 6 | 6 | | | |

 FALLOW

 WINTERCROP

 EVERY WINTER CROPPED

 PERMANENTLY CROPPED

47 = LANDUSE IN PERCENTS

FIGURE 4.7 Land every winter cropped.

4.6. CULTIVATION PRACTICES

Methods of tillage

Several tillage methods are practised. The farmers start preparing the field for wintercrops in mid-October and the preparation continues until the middle of December. Some farmers plough the field once, broadcast the seed and then plough again at right-angles to the original furrow. Other farmers do not plough the fields twice. Ploughing does not mean a great deal in any way. It merely loosens the top-soil to a depth of 5–10 cms. The soil is not turned. The plough is usually horse-drawn but in region 6 (T) around Hilla, oxen are also used as draught animals. After ploughing, the barley fields are divided into basins by means of small earth dykes in order to regulate the irrigation flow to some extent. These earth dykes are constructed every planting season by the farmers using simple spades. If in the following summer the barley fields are used for rice, the block system is made rather intensive. Before the rice fields are sown in May and June, the stubble is cleared by burning. No ploughing is done. The small earth dams are raised somewhat and the fields are flooded. In the meantime, the rice is soaked in water until germination commences. The germinated seed is broadcasted after the farmers have puddled the soil with their feet to obtain a smooth and impermeable seed bed.

Normally, the barley and rice fields are not ploughed immediately after the harvest, but left to the cattle to graze. A tractor is often used to plough the rice fields as the farmer's wooden plough can hardly break the hard top soil.

Barley

The seed is usually drawn from the landowner's stocks. The only variety used is the so called 'white barley'. Immediately after broadcasting the fields are irrigated and from then onwards irrigation water is applied once a month or once every three weeks, the fields being submerged to a depth of 6–8 cms. Dependent on the availability of water and the salinity of the soil, the fields are watered from 4 to 8 times. No weeding is carried out. Only the larger bushes of camelthorn and shock are removed. Harvesting takes place from the end of April till the end of May. It is done by hand using sickles. The farmer's wife and children collect the sheaves and pile them up in round heaps nearby. For one or two weeks the barley is then left in the field to dry. When the barley is fully dry, the whole harvest is piled up and the threshing with donkeys can be started. The animals thresh the barley by treading over a thin layer of sheaves spread out around the heap. After that the barley is winnowed by barking. The straw is transported to the farms by women or donkeys and ensilaged in pits in the ground and the grain is transported to the farm by (hired) camels. In the case of share-cropping, the grain is divided in the field in accordance with the shares.

Wheat

The cultivation methods employed for wheat are similar to those applied for barley. Usually, however, wheat is irrigated lighter but more frequently. Wheat is sown and harvested rather later than barley. The varieties of wheat used are Kurdiya, Ajeiba, Iraqiya and Saptā.

Rice

The rice fields are continuously kept flooded until two weeks before the harvest. The extent of weeding done depends upon the accuracy of the farmer and usually little care is taken of the rice during the growing season. No manure is applied. Harvesting takes place in September and October. The procedure is similar to that employed for barley. The only difference is that the rice straw is moistened before threshing to prevent breakage. After the harvest, the rice fields are grazed. The fields are ploughed during the following summer. Occasionally, but very rarely, the rice seed is sown in nurseries and transplanted. The varieties used, are Hawazawi, Naiaima and Amber. Hawazawi is more salt-resistant than Naiaima and Amber and is less sensitive to shortage of water. Therefore the farmers mainly plant Hawazawi although its market price is lower than the price of the other two varieties.

Vegetables

Vegetables are chiefly planted on the lighter soils (river or canal banks). Both intensive and extensive forms of cultivation may be distinguished. The intensive cultivation of vegetables is done mainly by farmowners in the neighbourhood of the large towns. The fields, after ploughing, are divided into blocks of 7 by 1.5 metres, or into rows at 1 metre intervals. The early spring vegetables are protected against night frost by means of palm-leaf covering. A fairly considerable amount of labour is required for this method of cultivation but it is profitable because the vegetables can be offered in the market early in the season when the prices are high. As the vegetables are planted on the lighter soil, they require much irrigation water. In December and January they are irrigated once a fortnight, in the months of May, June, July, August and September every four or five days and for the rest of the year once a week. They are frequently weeded. Fertilizer, in the form of mound earth mixed with old farmyard manure, is essential for this intensive cultivation.

The more extensive vegetable cultivation is practised on the larger holdings, particularly as far as water melons, tomatoes and egg plants are concerned. Ditches are dug at intervals of six metres in the field. On the ridges of those ditches through which the irrigation water is supplied, the vegetables are planted. No ploughing, weeding or manuring is done. Many of the bigger landowners reserve special areas in which only vegetables are planted. These areas are allocated every year to special vegetable cultivators who are not permitted to plant winter crops.

Dates

Various varieties of dates were found in the area, the principal ones being Zahidi, Gestawi and Sultani.

Zahidi is by far the most popular kind although it makes the lowest market price (Zahidi 4 fils per kilo, Gestawi 7.5-15 fils per kilo and Sultani 20 fils per kilo). Plantation of Zahidi is still continuing. The investigation shows that in:

| | |
|------------------------|-------|
| Region 1 (T) | 38.7% |
| Region 2 (T) | 14.2% |
| Region 3 (F) | 33.7% |
| Region 4 (F) | 44.1% |
| Region 5 (F) and 6 (T) | 7.7% |

of the total number of planted date-palms consist of young trees of Zahidi. The reasons why Zahidi despite its low financial return is still planted are:

1. simple cultivation requirements;
2. good keeping quality ('dry date');
3. many possibilities for domestic and other use e.g. as food and for the preparation of sweet desserts, syrup, mineral waters and arak.

Side-shoots with roots are planted at intervals of about 7 metres. The old leaves are taken away and only the youngest leaves around the growing point (3 or 4 in all) are not cut away. Planting is done in April and May. During the first four years, barley is often sown among the young trees. The young palms must be irrigated frequently. Apart from this they require little attention. The trees have to be protected from frost in the first year. This is done by covering them with palm boughs. Furthermore, they are protected during the first 8-10 years from damage by the live-stock (donkeys and goats). The roots above ground level are earthed up in the early years. After 4 to 5 years the first clusters of fruit appear, with a production of 4-5 kilos per tree. Production increases fairly rapidly after the seventh year. An average maximum yield of 50 kilos per tree is obtained after fifteen years. This production can be maintained for many years but afterwards it decreases slowly. Some good trees are kept for 60 years but most of them are cut down after 30 or 40 years.

The productive trees are usually irrigated twice a year only, viz. in July and August. As the date-palms are mainly planted on the banks of the rivers and canals, they utilise the underground flow of fresh water (seepage) which is present there.

The methods employed for the pollination and harvesting of the date-palms require much labour. Pollination is done by plucking the male flowers, dividing them into pieces and fastening them into the female inflorescence. Male flowers are a marketable commodity. The ripe, heavy clusters have to be supported by sticks ('turkees') to prevent them from breaking. During the harvest the clusters are thrown down and then collected and sorted out by women and children ('toshi').

In addition to dates, the palms also produce leaf sheets and timber. The leaf sheets are used for roofing houses and for covering vegetables; the timber is used for building purposes.

4.7. YIELDS OF CROPS

To determine the yields of the crops, farmers and landowners were interviewed. The data obtained from the interviews have been collected in table 4.7.

Only the yields of those crops of which sufficient data were available to determine a justified mean were included in table 4.7.

The figures of the yields are based on the quantity of produce, which the farmer has to pay for transport, threshing and rent (share).

For transport and threshing there are generally recognized standards of payment which for transport usually amount to 12.5 kilos per 200 kilos of produce transported and for threshing to 100 kilos per two tons of produce threshed. For transport an extra 24 kilos per two tons must be paid to the camel driver. For rent a recognized share of the produce, if share-cropping is involved,

TABLE 4.7. Average yields of crops

| Region | 1 (T) | 2 (T) | 3 (F) | 4 (F) | 5 (F) | 6 (T) |
|----------------------|-------|-------|-------|-------|-------|-------|
| In kilos per meshara | | | | | | |
| Wheat | 214 | 221 | 128 | 168 | — | 205 |
| Barley | 224 | 223 | 174 | 188 | 190 | 140 |
| Broad beans | 175 | 208 | — | 200 | 220 | 210 |
| Cotton (lint) | 202 | 208 | 132 | — | — | — |
| Millet | 206 | 196 | 200 | 180 | — | — |
| Orchards (dates) | 903 | 843 | 710 | 755 | 857 | 905 |
| Rice | 278 | 268 | 211 | 214 | — | 230 |
| Sesame | 93 | 91 | 81 | 70 | 63 | 150 |
| Greengram | 60 | 119 | 108 | 134 | — | — |
| Sorghum | 200 | 200 | — | 100 | — | — |
| In ID per meshara | | | | | | |
| Vegetables | 19.0 | 22.5 | 19.5 | 23.0 | 20.0 | 22.0 |

has to be paid to the landowner. On the basis of the figures stated for transport, threshing and rent, it was possible to check the yield data.

Only for vegetables did it appear extremely difficult to obtain exact production figures in kilos. In the first place part of the vegetable production is consumed on the holding, while the cereals are usually stored before consumption. Secondly a certain amount of the vegetables is converted into cash in the market early in the season. Vegetables market early in the season give considerably more profit than later in the season when the supply is much greater and the price falls down rapidly. Taking these factors into account it was assumed that the total vegetable production per meshara varies between 1,500 and 2,500 kilos (the average price of a kilo is about 10 fls).

The alfalfa production is not included in the table. The production per meshara lies between 15 and 20 thousand kilos for 8 to 10 cuttings per year.

To give a clear picture of the variations, the yields of barley in the total area and in the separate regions 1 (T), 2 (T), 3 (F) and 4 (F) are given in figure 4.8. Of the investigations (1200) frequency distributions are shown.

Most of the figures found were between 75 and 300 kilos. It is typical that in region 1 (T) and 2 (T) most of the figures were between 75 and 300 kilos, whereas in the region 3 (F) the peak was found between 75–150 kilos after which the yield decreases gradually.

The extent of the fallow land available notably effects the yields. In the whole of region 3 (F) the yields of wheat and barley are considerably lower than in region 1 (T) and region 2 (T). The figures for fallow land are 31.2% for region 3 (F) and 49.1% for region 1 (T) respectively.

The rice production is mainly determined by the quantity of irrigation water available. In the regions of the landowners a fairly well working organization to manage the irrigation water is provided for. This results in higher yields compared with the yields obtained by farmowners because among the latter there is not the proper cooperation necessary for the maintenance of the irrigation works. The yields of sesame and greengram are low everywhere. For sesame this is due to its poor salt resistance and for greengram to its susceptibility to diseases.

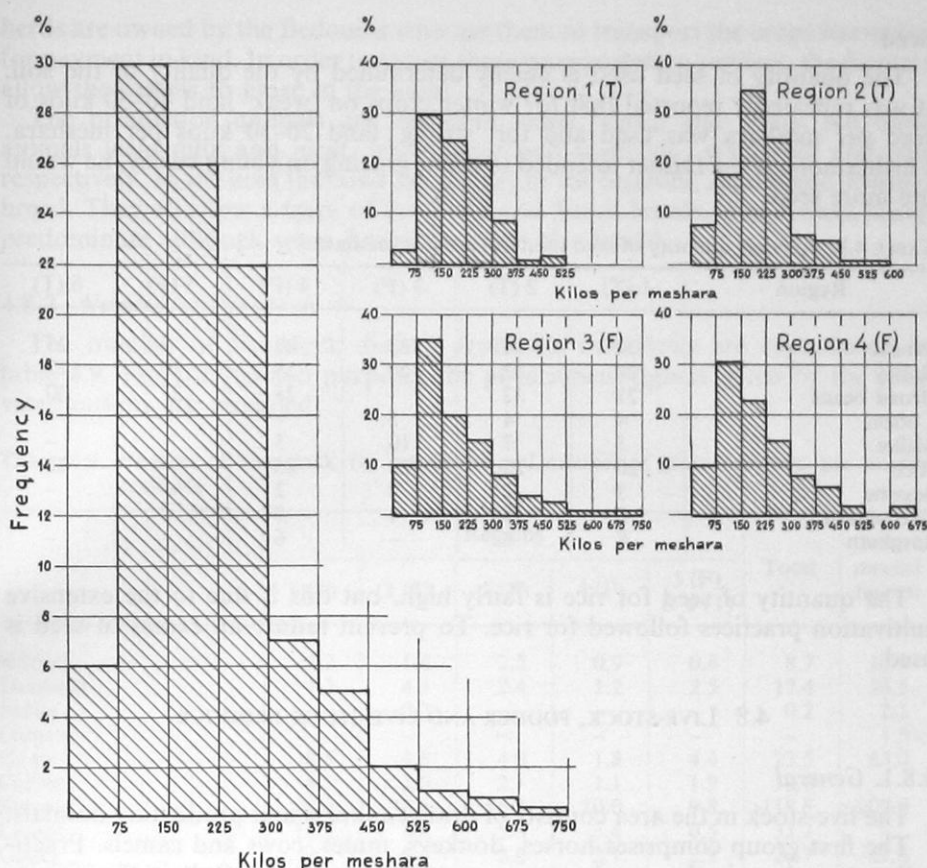


FIGURE 4.8. Frequency distribution of yield of barley in kilos per meshara.

In general it must be remembered that many other factors are determining the yield, such as the ability of the farmer, the quantity of irrigation water available and the soil fertility.

In general the yields are very low. One of the principal causes, as it is generally thought, is the salinization of large parts of the area. In its turn it gives rise to a decrease of the fallow land, which has a further harmful influence on production. But in other parts of the Middle East, where no salinization is involved and in Canada, averages of 250 kilos of wheat per meshara and 260 kilos of wheat per meshara are recorded respectively (54). Drainage only therefore will probably not solve the problem of the low yields. Another reason why in the area yields are unfavourable affected must be mentioned, namely the grazing of cattle on young barley. This mainly occurs in those fields where the young barley crop grows well. It is difficult to determine quantitatively how much production is reduced in this way, but it may on the whole be assumed that there is some reduction of the yields, though on a small scale.

No manure is used on cereals, vegetables and cotton except in case cotton is sown in the same fields every year. Moreover, manuring is so casual that on the whole it does not cause considerable changes in production. Only for the vegetables grown around Hilla in region 6 (T) an exception must be made, because here mound soil is used.

Seed

The quantity of seed used is chiefly determined by the quality of the soil. It was repeatedly reported that for winter crops on 'weak' land 40-50 kilos of seed per meshara was used and for 'strong' land 20-30 kilos per meshara. Furthermore, if the farmer intended to allow grazing on young barley, he would use more seed.

TABLE 4.8. Average quantity of seed used in kilos per meshara

| Region | 1 (T) | 2 (T) | 3 (F) | 4 (F) | 5 (F) | 6 (T) |
|-------------|-------|-------|-------|-------|-------|-------|
| Wheat | 20 | 24 | 23 | 22 | — | 25 |
| Barley | 28 | 32 | 29 | 28 | 30 | 27 |
| Broad beans | 27 | 32 | — | 25 | 27 | 30 |
| Cotton | 4 | 4 | 5 | — | — | — |
| Millet | 5 | 7 | 10 | 5 | — | — |
| Rice | 20 | 22 | 22 | 25 | — | 22 |
| Sesame | 3 | 2 | 2 | 2 | — | — |
| Greengram | 5 | 3 | 4 | 7 | — | — |
| Sorghum | 8 | 8 | — | 6 | — | — |

The quantity of seed for rice is fairly high, but this is due to the extensive cultivation practices followed for rice. To prevent failure an excess of seed is used.

4.8. LIVE-STOCK, FODDER AND LIVE-STOCK PRODUCE

4.8.1. General

The live-stock in the area consists of draught animals and production animals.

The first group comprises horses, donkeys, mules, cows and camels. Practically everywhere in the area horses are used for ploughing. Only in the vicinity of Hilla cows are also used for this purpose. Two cows are yoked for the plough, while as to horses and mules only one animal is used.

So the owning of a horse is important for a farmer. As many farmers have not sufficient financial sources to buy a horse, it is possible for them to become part-owners of a horse. Every horse consists of four parts (the four quarters). By buying one or two parts, the farmer obtains the right to use the horse on the condition that he partly maintains and takes care of the animal. More than 50% of the farmers questioned owned one or two quarters of a horse. Any foal born remains the property of the original owner of the horse.

An important task of the horse is to work the water lifting devices, which are used mainly in region 3 (F) to lift the water for the irrigation along the high banks of the canals. For this purpose the animal is blindfolded. Horses are also employed as saddle animals. All horses are Arab breed. Donkeys are used as pack animals and as saddle animals. They are also used for threshing. Usually a man, who owns 5 or 6 donkeys, goes round at harvest time to thresh the crop harvested for payment in kind. It also happens, however, that the villagers bring their cows and donkeys together and help each other in that way. Mules are only found in the south of the area and they do the same work as the horse does.

Although the farmers themselves possess no camels, at harvest time large herds of camels are seen in the area grazing in the idle and fallow lands. These

herds are owned by the Bedouins who use them to transport the crops harvested for payment in kind. In order to secure these transportation services, the farmers allow the camels to graze in the area.

The production animals are buffaloes, cows, sheep and goats. All these animals yield milk and meat, while sheep and goats also give wool and hair respectively. In the area the cows are mainly of the Sharobi, Jenubi and Rustagi breed. They all show a trace of the Zebu and Sundi breeds. The Awassi sheep predominate although some Arabi sheep are also found.

4.8.2. Number of live-stock

The number of live-stock derived from the interviews are reproduced in table 4.9. For comparison purposes the government figures given by the local veterinarians are recorded:

TABLE 4.9. Number of live-stock (in hundreds) and number of gross meshara per animal available

| | Regions | | | | | Total | Governmental figures |
|-----------------------------------------|---------|-------|-------|-------|---------------|-------|----------------------|
| | 1 (T) | 2 (T) | 3 (F) | 4 (F) | 5 (F) & 6 (T) | | |
| Horses | 3.2 | 1.6 | 2.2 | 0.9 | 0.8 | 8.7 | 13.5 |
| Donkeys | 7.2 | 4.1 | 2.4 | 1.2 | 2.5 | 17.4 | 28.5 |
| Mules | — | 0.2 | — | — | — | 0.2 | 2.1 |
| Camels | — | — | — | — | — | — | 1.5 |
| Cows | 8.5 | 4.8 | 4.0 | 1.8 | 4.4 | 23.5 | 63.0 |
| Calves | 4.5 | 3.0 | 2.1 | 1.1 | 1.9 | 12.6 | — |
| Sheep | 49.9 | 32.6 | 16.5 | 10.0 | 9.8 | 118.8 | 207.0 |
| Lambs | 15.2 | 8.8 | 5.8 | 3.4 | 0.5 | 33.7 | — |
| Goats | 9.2 | 4.3 | 2.2 | 2.1 | 2.9 | 20.7 | 61.6 |
| Kids | 2.9 | 1.1 | 0.6 | 0.8 | 0.1 | 5.5 | — |
| Buffaloes | 0.3 | — | 0.1 | — | — | 0.4 | 2.2 |
| Poultry | 18.4 | 14.9 | 12.6 | 4.7 | — | 50.6 | — |
| Gross mesharas per animal excl. poultry | 5.3 | 5.7 | 5.6 | 3.0 | 1.6 | 5.1 | 3.2 |

In view of the important place the live-stock takes in the farmer's income (cf. 4.11.4) if our own figures are taken into consideration it does not seem justified to set great value on the governmental figures. Moreover, these figures were given conditionally. Only for the buffaloes the government figures give a better estimate than our figures, because during the interview the towns of Hilla and Diwaniya were excluded and most buffalo dairies are situated in these towns.

4.8.3. The feeding of the live-stock

The live-stock is fed in the following ways:

1. grazing on fallow, waste and idle lands;
2. grazing in fields with young barley and feeding of cuttings of barley;
3. grazing on irrigated fallow lands;
4. feeding with barley.

1. All fallow, waste and idle land is used for grazing ground in winter and in summer. After the first winter rains, grass and weeds sprout on all uncultivated land. In summer the cattle mainly feeds on the stubble of the barley and wheat harvested. In winter the rice fields are grazed. As the rice stubble can only be found in a very small part of the area and as a great part is taken for the growing of wheat and barley, the shortage of fallow land compels the farmer to use supplementary feeding, especially in winter.
2. Three cases must be distinguished here:
 - a. Grazing on barley which is 45 to 60 days old. This mainly occurs in places where the crop grows luxuriantly. The landowner permitted the tenants to graze horses and cows on the young barley for a period of 10 to 20 days. After this period, the live-stock was no longer permitted in the fields and the crop was allowed to put forth ears. The object of this pasturing is two-fold, viz. to feed the animals and to prevent lodging of the crop.
 - b. Grazing on barley which is 100 to 120 days old. In this case the crop is completely grazed and there is no harvest to follow. If the farmer applies this form of pasture, he will employ a considerable quantity of seed in order to promote the density of barley.
 - c. When barley which is 90 to 120 days old is cut, the leaves are halved only. The purpose is again feed for the animals and the prevention of lodging. In this case a harvest is as yet obtained.
3. The irrigation of fallow land is only applied on a limited scale. In winter the rice fields and in summer the wheat and barley fields are irrigated once or twice immediately after harvest. The farmer is fully aware of the fact that the irrigation of lands which lie fallow for a whole year would require too much water. By irrigating the fields harvested recently, he also takes advantage of the higher moisture content of the soil and the weeds already present among the stubble. Special attention is paid to the irrigation of these fallow lands in dry years.

The landowners usually proceeded to sell the right to graze cattle on these irrigated lands at the highest possible price. The amount paid varied from 2 to 5 ID per meshara.

There is another form of irrigating land for cattle grazing, the so-called 'haphazard irrigation'. In those places, where the irrigation channels are above ground level and the dyking is not reliable, or where the farmer leads the surplus of irrigation water on to the fallow lands, the irrigation water runs over the land. The abundant growth of grass and weeds as a result of this type of irrigation forms good pasture. The amount of land flooded for pasture totals 4.5% of the farmland.

Horses, sheep and goats are usually given a supplementary feeding of barley in winter. It is typical that this supplementary feeding should be necessary in winter, if there is not enough fallow land available. The quantity of fodder supplied per animal depends on the one hand on the activities and the physical condition of the animal and on the other hand on the quantity of fallow land available. It was repeatedly reported that horses receive 400–600 kilos of barley per year if, in addition to ploughing, they are also used for working water lifting devices. Sheep and goats receive 30–50 kilos of barley per

animal in winter. Young weak lambs are given rather more food, because they are weaned after a few weeks. Cows seldom receive barley and only pregnant cows or weak calves are given supplementary feeding. The straw is given chiefly to horses and cows.

It is estimated that 16.4% of the total barley yield is given to live-stock. However, the variations from region to region are considerable, as may appear from the following estimates:

TABLE 4.10. Estimated percentage of total barley produce given to live-stock

| | Percentage of gross area | | Percentage barley given to live-stock |
|--------------|--------------------------|-----------------------|---------------------------------------|
| | waste and iddle land | fallow land in winter | |
| Region 1 (T) | 52.4 | 23.4 | 18.5 |
| Region 2 (T) | 49.0 | 19.9 | 14.0 |
| Region 3 (F) | 56.5 | 13.6 | 14.5 |
| Region 4 (F) | 41.4 | 21.4 | 11.6 |
| Region 5 (F) | 1.5 | 1.1 | 45.0 |
| Region 6 (T) | 11.1 | 18.1 | 52.0 |

In the date-palm area, owing to the scarcity of pasturage facilities, it is necessary to give considerable quantities of barley to the animals.

It seems strange that forage crops should not have been introduced. This is principally due to two causes, viz. lack of interest on the part of the landowners, and shortage of irrigation water. Especially the lack of interest of the landowners should be considered as the main cause for the landowners were not interested in live-stock because they did not receive any rent from it. Alfalfa for instance grows very well under Iraq conditions although KEEN (28) reports otherwise.

4.8.4. Live-stock production

Estimates of the milk production of cows, sheep, goats and buffaloes in kilos per lactation period are given in the following table:

TABLE 4.11. Average kilos of milk per lactation period

| | Cows | Sheep | Goats | Buffaloes |
|------------------|------------|------------|------------|-------------|
| Lactation period | 3-6 months | 2-3 months | 2-3 months | 8-12 months |
| Region 1 (T) | 397 | 22.5 | 21.8 | 1,215 |
| Region 2 (T) | 366 | 21.6 | 21.9 | |
| Region 3 (F) | 368 | 22.7 | 21.7 | 1,290 |
| Region 4 (F) | 359 | 36.3 | 35.0 | |
| Region 5 (F) | 350 | 17.0 | 17.0 | |
| Region 6 (T) | 336 | 18.0 | 18.5 | |

In figure 4.9 the variation in the yields of milk per cow are shown graphically.

The milk production of sheep and goats is particularly low. They are kept primarily for meat production, milk being only a by-product. Investigations at Abu Graib, the Agricultural University Research Station, showed that the fat content of the milk of cows is about 3.7%. The fat content of the buffalo's milk amounts to 8.3. %. The percentage of fat in the milk of sheep and goats is

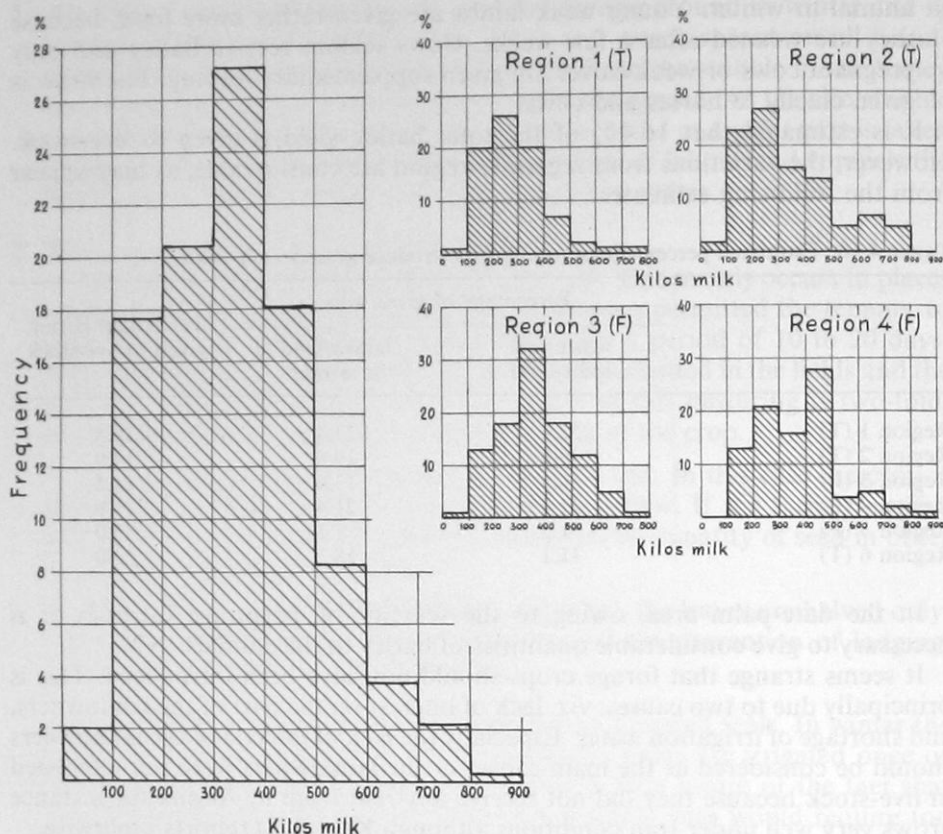


FIGURE 4.9. Frequency distribution of average milkproduction of cows per lactation period.

about 4. The protein content of cow's milk in Iraq amounts to 3.5%, while sheep's milk and goat's milk have a somewhat higher percentage.

Practically all milk is processed on the holding itself to butter, yoghurt and lebon (buttermilk). About 30% of the buffalo's milk is sold as fresh milk. Some 50% is processed into yoghurt and the rest sold as thick cream.

It was not possible to obtain exact figures of the yields of wool and hair. These commodities are sold as 'fleeces'. By interviewing wool-merchants and by performing some weighing tests, it was determined that a sheep produces about 1.5 to 2 kilos of wool per year, and a goat about 1 to 1.5 kilos of hair per year. A considerable quantity of the wool and hair is used on the farm by women to make clothing, sacks or covers. It is asserted that the Iraqi farmer shears his sheep badly (56). This is only partly true. The sheep are not shorn around the neck to prevent a sunstroke.

Buffalo steers are not used as draught animals but are sold when they are still young. As buffaloes are fed far more intensively than the other animals, it does not pay to bring up the young buffalo steers. The information on the quantity of fodder in kilos per full-grown buffalo per day shows: alfalfa 50 kilos, cotton seed 2 kilos, sesame buds 3 kilos, barley chaff 3 kilos, barley bran first quality 5 kilos, second quality 4 kilos, rice chaff 4 kilos, rice bran 3 kilos and straw 5 kilos.

4.9. TENANCY CONDITIONS

Large and medium holdings

As stated in 4.3, an important part of the land in the area was in the hands of large landowners. Most of these landowners, with the exception of a few lawyers and merchants whose properties were mainly situated in the vicinity of Hilla and Diwaniya, were the tribal chiefs of the tenants. Practically all sheiks were living on their property in the country. Only a few lived in the towns of Hilla or Diwaniya. There were no absentee landlords, that is to say not in the Hilla-Diwaniya territory. The sheiks administered their lands through agents who organized all the usual activities and supervised the cultivation process. They also acted as advisers of the sheik.

For the performance of the various duties a sheik employed:

- a. 'Murakibs' – agents who were responsible for the correct distribution of the irrigation water. They supervised and organized the cleaning of the irriga-works. They were responsible that this was done in the proper way and by the right people.
- b. 'Wakils' – agents who had to ensure that the sheik received his proper share of the harvest. They supervised the allotment of the land and the cultivation of the crops.
- c. 'Hurras' – agents who had to prevent theft and the stealing of the crops in the fields. In threshing-time they watched the threshing-floors.

Only the bigger sheiks employed special agents for the various jobs to be done. The smaller landowners usually had only one representative who was responsible for the entire organization.

The agents received their wages from the landowners, with the exception of the agent who divided the crops. He was paid by both parties (25–50 kilos per 2 tons of crop harvested). In most cases the tenant also had to pay for the coffee-man who was the employee of the sheik and who made the coffee and tea and served in the 'mudhif', the sheik's reception centre.

The rent which the tenant had to pay to the landowner was extremely high. Until recently, this was usually half the winter and summer crop. As to the smaller sheiks, conditions were still worse as the cultivator had to give three fifths sometimes, even two thirds of his harvest.

In the date-palm area the rent also depended on the ownership of trees. There are 3 possibilities:

1. The landowner pays for all the cultivating practices and supplies the young shoots.
2. The landowner and the tenant pay each half the cost involved.
3. Only the tenant bears all the cost.

In the first case the tenant was entitled to one third of the crop, in the second case to half the crop, and in the third case to two thirds of the crop. For the crops planted between the date-palms there were no fixed rules. The rent varied from one eighth of the crop to half the crop.

As a rule no rent was charged for grazing cattle on the non-irrigated fallow lands. Here and there, however, the tenant had to give a sheep or lamb every year.

The landowner supplied the land and the water, and the tenant had to pay rent for each of it. In most cases land and water were supplied by the same landowner, though in the more southern parts of the area – mainly in case of pump irrigation – the owner of the land and the supplier of the water might be two different persons. In such a case the components: labour, tools, seed, land and water – which in the Middle East form the essential basis of the share-cropping system (31) – are not divided in five shares as usual but in six or seven. The landowner is then entitled to one sixth or one seventh, the water supplier and tenant each to five twelfths or three sevenths of the harvest, which clearly shows how important the supply of water is.

All exploitation costs were paid by the cultivator. Practically everywhere the seed was supplied in advance by the landowners. The tenant paid back the seed – without additional charge – when the harvest was divided.

The land was divided and allotted after the cleaning of the irrigation ditches, before winter crops were sown. The landowners decided which part of the holding would be cultivated. Plots of the same size were often allocated to the various tenants by ballot, as a principle of justice. For it is clear that the more saline less fertile fields as well as the fields situated at some distance from the main irrigation canal or outside the village are less desirable. 'So, if the land is balloted every year, all farmers have a reasonable chance of receiving a favourable field' (47). In spite of this system the relatives and the friends of the landowner usually got bigger parts than the ordinary tenants.

Farmowners

The farmowners are the legitimate owners of their lands and pay no rent. Only if their land is irrigated by means of pumps, water rights have to be paid to the owner of the pumps.

Property may be most complicated. A plot of land owned by three farmers, for instance, may be divided into 275 shares. The first farmer may have 75 shares, the second 100 and the third 100. It even happens that the land is not one unit, but is broken up into several pieces scattered widely over the area. It depends on the number of their shares to what extent the farmers can exercise property rights on each of the pieces. Generally the farmers solve the problem of these complications by cultivating all the fields of the farm together and by dividing the yields according to the number of shares held by each, a system also found by Doreen Warriner (47) in Palestine among the small Arab cultivators.

The farmowners apply the Niren system, if the crop is sufficient for their needs. However, if as a result of salinization, the acreage of cultivable land is too small they are forced to cultivate a part of their land more than one winter in succession, or they do not till their own land for one year after several years of intensive cropping, and in that period work on a sharecropping basis for a landlord.

4.10. FARMING UNIT

4.10.1 *Size of the farming units*

With respect to the size of the farming units noteworthy differences were found.

The tenants in regions 1 (T), 2 (T) and 6 (T) received a piece of land every

year. The landowner decided which part of his property would be cultivated in a definite year. Under supervision of the representatives the tenants organized a ballot as a result of which equal pieces were allocated. In this allocation waste and idle lands were not considered.

The farmers in regions 3 (F), 4 (F) and 5 (F) are farmowners who cultivate their own land. As a result of salinization, parts of their fields have become unsuitable for agriculture in the course of the years. They, however, legally also own these saline soils which are consequently reported in table 4.12. Under prevailing circumstances, many farmowners do not see a way to obtain sufficient income from their own farm. They try to supplement their income by farming as tenants on the large holdings of the landowners. In the south of the area it was also found that a farmer will cultivate his own farm intensively for three or four successive years without winter-fallow. In the fourth or the fifth year he fallows his entire land and works as a tenant on the property of a big landlord.

In Table 4.12 the average size of the farms for the various groups is given. This table also contains the average size of the families, and the average number of male and female workers per farm.

TABLE 4.12. Average size of farms per family, average size of families, and average number of workers per family

| Region | Number of mesharas | | | | | | | | Family size | Numbers of working age | |
|--------|-----------------------|--------------|--------------|----------|--------|---------------------|----------------------|--------|-------------|------------------------|--------|
| | per family | winter crops | summer crops | orchards | fallow | idle and waste land | cultivated as tenant | | | male | female |
| | | | | | | | winter | fallow | | | |
| 1 (T) | 66 | 32.6 | 4.6 | 0.4 | 33 | | | | 5.9 | 1.7 | 1.5 |
| 2 (T) | 53 | 29.7 | 4.7 | 0.3 | 23 | | | | 6.4 | 1.7 | 1.7 |
| 3 (F) | 48 (54 ¹) | 19.3 | 2.3 | 1.7 | 11 | 16 | 3 | 3 | 6.7 | 1.6 | 1.8 |
| 4 (F) | 36 (48 ¹) | 18.4 | 2.4 | 0.6 | 14 | 4 | 6 | 6 | 6.0 | 1.6 | 1.7 |
| 5 (F) | 8 (16 ¹) | 1.0 | 1.0 | 4.0 | 1 | 2 | 4 | 4 | 7.3 | 1.4 | 1.7 |
| 6 (T) | 19 | 6.0 | 1.0 | 7.0 | 6 | | | | 7.6 | 1.5 | 1.8 |

¹) Including the mesharas cropped as tenant.

The figures found for regions 1 (T) and 2 (T) and 3 (F) and 4 (F) are worked up graphically in figure 4.10.

These figures show, that the greater percentage of the farms of the farmowners lies between 5 and 35 mesharas. The greater percentage of the farms of the tenants is found between 15 and 65 mesharas.

In order to be able to compare the size of the family with the number of labourers available at the farm it was necessary to determine what might be called a unit of labour. It was decided that every male between 16 and 60 years of age should be considered as one labour unit. Every female between 16 and 50 years of age, and all children, males and females between 12-16 were considered as one half labour unit.

Full- and part-time labourers not belonging to the family are not employed (which is typical of subsistence farming).

The relation between size of family and labourforce for region 1 (T) and 3 (F) follows on page 58.

| Family size | Region 1 (T) labourforce | Region 3 (F) labourforce |
|-------------|-----------------------------|-----------------------------|
| 1 | — | 1 |
| 2 | 1.50 | 1.28 |
| 3 | 1.64 | 1.47 |
| 4 | 1.74 | 1.72 |
| 5 | 2.25 | 1.87 |
| 6 | 2.49 | 2.37 |
| 7 | 2.81 | 2.90 |
| 8 | 3.35 | 3.05 |
| 9 | 3.50 | 3.86 |

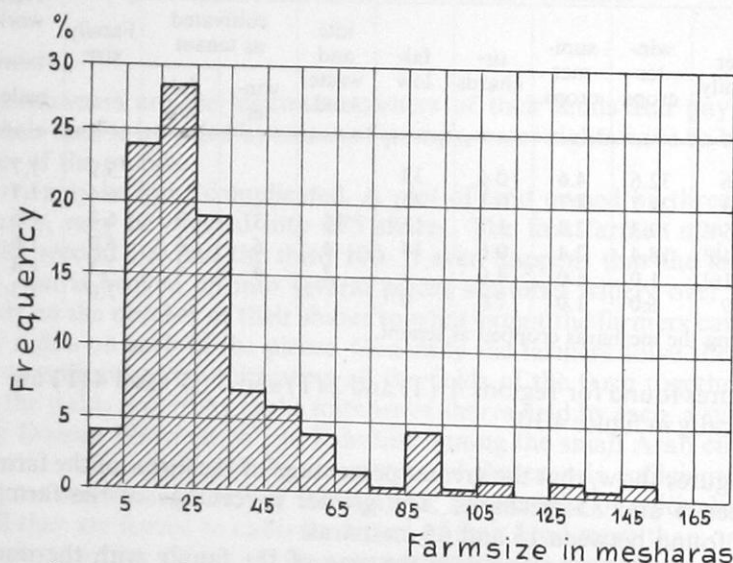
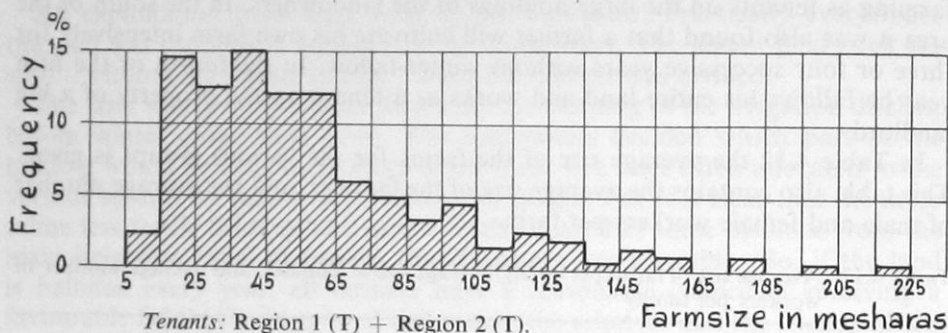


FIGURE 4.10. Frequency distribution of farms in size for tenants and farmowners.

The landowners could control the farmsizes, while the inheritance law of the Koran, which causes the splitting up of family owned farms, did not apply to the farms of the tenants but does apply to the farms of the farmowners.

4.10.2. Farmunit – live-stock

The data collected concerning the number of live-stock per farm are given

in table 4.13. In order to avoid fractions the figures have been calculated per 10 farms.

TABLE 4.13. Average number of live-stock per 10 farms

| Region | Horses | Mules | Donkeys | Cows | Calves | Sheep | Lambs | Goats | Kids | Buffaloes | Poultry | Total mesh. of 10 farms |
|--------|--------|-------|---------|------|--------|-------|-------|-------|------|-----------|---------|----------------------------|
| 1 (T) | 8 | — | 18 | 21 | 11 | 122 | 38 | 20 | 6 | 1 | 46 | 660 |
| 2 (T) | 5 | 1 | 13 | 17 | 10 | 96 | 31 | 14 | 3 | — | 48 | 530 |
| 3 (F) | 7 | — | 8 | 13 | 7 | 62 | 22 | 8 | 3 | — | 43 | 480 |
| 4 (F) | 7 | — | 10 | 15 | 9 | 85 | 29 | 18 | 6 | — | 39 | 360 |
| 5 (F) | 1 | — | 8 | 15 | 6 | 22 | — | 14 | — | — | 47 | 80 |
| 6 (T) | 5 | — | 8 | 13 | 6 | 45 | — | — | — | — | 29 | 190 |

In 'The Economic Development of Iraq' published by the International Bank for Reconstruction and Development (56) it is stated: 'Sheep and goats are kept primarily by pastoral nomads' and 'Live-stock, however, is an adjunct to agriculture rather than an integral part of it. Many fallahin have no live-stock at all except for a draught animal or two'. The figures of table 4.13 show clearly that such statements are misleading and are not quite correct, at least for the Hilla-Diwaniya area. The very important role of the live-stock is apparent from the farmer's income (cf. 4.11). In this respect the pattern of farming in the Middle Eastern regions differs substantially from the farming in great parts of Africa, South and South-East Asia (4).

4.11. FARMER'S INCOME

4.11.1. General

The gross income of the farmer comprises the proceeds of his crops and cattle.

In the calculations wheat, barley and broad beans were considered as winter-crops. All other crops, except the date-palms were classified under summercrops.

The income derived from live-stock was sub-divided into meat, milk, eggs, wool and hair. To determine the meat production the lifetime of buffaloes was estimated to be 20–30 years, that of cows 10–15 years, that of sheep and goats 5 years and that of hens 1 year. Calves were not included and it was assumed that the flock of lambs and kids was constantly kept at the same level. It was estimated that for instance a farmer, who owned 10 sheep and 5 lambs, will use 2 sheep and 3 lambs for meat production. The remaining two lambs will replace the sheep, which are killed or sold. Of course the farmer will first dispose of the male cattle. In the country milk is not for sale, but used in the diet as ghee or yoghurt. The lay of a hen was estimated to be 50 eggs a year on an average. As the informants were only males they could not give reliable figures, because women take care of the hens.

4.11.2. The choice of prices

Prices of most products in the area were subject to fluctuations which can be extreme for wheat and rice, for those products are consumed in the country

itself. Prices are low, when stocks are abundant. The price of barley is fairly stable, because the export price of barley is regulated by the government, and hence the merchants usually follow the price fixed. For cereals prices are highest before the harvest and lowest immediately after it. In summer, prices for live-stock products are naturally lower than in winter.

There is a distinct difference between the prices the producer receives and the selling price to the consumer. In the following list the differences are shown:

TABLE 4.14. Prices of products (crops)

| Crops | Price for the producer in fils per kilo | Selling price to the consumer in fils per kilo |
|---------------|-----------------------------------------|------------------------------------------------|
| Wheat | 20 | 35 |
| Barley | 10 | 20 |
| Broad beans | 12-20 | 30-50 |
| Rice (paddy) | 15 | 40 |
| Sesame | 45-50 | 70 |
| Greengram | 20-30 | 40 |
| Cotton | 45-50 | - |
| Millet | 10-13 | - |
| Sorghum | 10-13 | - |
| Vegetables | 5-50 | 15-100 |
| Alfalfa | 5 | - |
| Dates: Zahidi | 3-15 | - |
| Gestawi | 15 | - |

TABLE 4.15. Prices of products (live-stock)

| Live-stock products | Price for the producer in fils per head |
|-------------------------------|-----------------------------------------|
| Buffaloes: steer (1 year old) | 5,000- 6,000 |
| buffalo (15-25 years old) | 30,000-60,000 |
| Cattle: steer (4 years old) | 8,000-10,000 |
| cow (10-15 years old) | 8,000-15,000 |
| Sheep: lamb (6 months old) | 2,000- 2,500 |
| sheep (1-5 years old) | 2,000- 3,000 |
| Goats: kid (6 months old) | 500- 1,500 |
| goat (1-5 years old) | 1,500- 3,000 |
| | in fils per kilo |
| Poultry (old) | 200-250 |
| Eggs | 170 |
| Milk | 20 |

To calculate the several items which contribute to the farmer's income they had to be brought into one and the same price basis as to render them comparable. It was therefore decided to express all products including the home consumed products, which contributed to the gross income in the price which according to the farmer interviewed could be obtained in the market in case he sold his produce. As the greater part of his produce never reaches the market,

because it is consumed on the farm or paid out in kind, the farmer's selling price current at the moment of the survey was taken for the calculations. The same procedure was followed for the exploitation costs and the rent. With these prices the gross and net income was computed.

4.11.3. *Exploitation costs*

Out of the gross income the farmer has to pay exploitation costs and rent.

The expenses in this category could be sub-divided into:

1. Seed.
2. Depreciation of tools.
3. Depreciation of draught animals.
4. Fodder.
5. Taxes.
6. Labour.
7. Hired services.
8. Farmbuildings.
9. Rent.

ad 1. Seed

The selling price of the product and the price of the seed were taken to be the same. Only the price of vegetable seed had to be taken considerably higher, because this seed is collected and cleaned in the towns and offered for sale in small quantities at relatively high prices.

ad 2. Depreciation of tools

The principal assortment of tools the farmer uses are:

Breaker plough. This plough consists of a beam and a pointed plough-share. Beam, plough-share and handles are made of wood. The plough-share is clad with a plough shoe of iron. The plough merely breaks and lifts the soil, leaving an open furrow, without turning the soil.

Harness. The harness consists of a single yoke.

Spade. The spade is used to dig and clean irrigation ditches and to make small dykes around the irrigated field plots. The spade is provided with a foot rest.

Hoe. The hoe is used to cut big bushes and to gather fuel.

Sickle. The sickle is a curved steel blade ending in a point attached to a short handle. The sickle is used for reaping.

Fork. The fork is made of a wooden head and tines. There are two types: one with two tines for handling grain-sheaves and another with five or six tines for grading.

The farmers in the date-palm area have in addition special tools to lay out vegetable beds and a climb-rope to pick the dates.

After one year's use all tools for ploughing have to be repaired or replaced. It is even usual to replace the steel point of the plough a few times a year. Repairs are often paid in kind and many farmers have a carpenter who is paid a fixed amount of barley yearly on the condition that he keeps the tools in good condition. For cost calculations all tools were written off in one year with the exception of the water lifting devices which will last from 20-40 years.

ad 3. Depreciation of draught animals

To simplify matters the average life of a horse or donkey was taken to be 10 years.

The tools and the draught animals form the only 'intern' capital of the farm in the Hilla-Diwaniya area.

ad 4. Fodder Cost of fodder could be divided into:

- a. cost of fed barley;
- b. cost paid for grazing;
- c. cost of shepherd.

Only farmers who own great flocks of sheep and/or goats employ a shepherd. This man usually is paid in food plus some additional barley.

ad 5. The taxes of pious institutions

Many farmers commit themselves to pay a small amount of barley or wheat to the priests of the mosque. As it is paid in kind and these payments are related to the farm they are counted as farmcost.

ad 6. The expenses for labour

Practically no hired labour is used in the area. During the busy harvest times the farmers help each other a hand. Only in the date-palm area it is necessary to hire labourers for pollination of the flowers and picking of the dates. For that reason exploitation costs in the date cultivation are high. For pollination an amount of 10 fils or 2 kilos of dry dates per tree is paid. Every harvest labourer receives 200–250 fils per day and for 'toshi' every woman gets 2 kilos of dates per tree and every child 1 kilo of dates per tree. Of course, the amount of hired labour depends on the size of the farmer's family.

ad 7. Hired services

Some landowners and machinery shops in the cities have tractors for hire. They perform ploughing for the farmers at a fixed price (500–600 fils per meshara), especially in the rice fields. Threshing is paid in kind and the usual compensation is 100 kilos of every 2 tons of the crop threshed. For sorghum and millet the price is only 50 kilos per 2 tons, threshing of these products being so much easier. Also the transport from the field to the farm is charged for. This work is mostly done by camels. It is paid in kind, viz. 12.5 kilos per 200 kilos of the crop conveyed. On top of that the camel driver gets 24 kilos per 2 tons extra.

ad 8. Farmbuilding

The cost of farmbuildings was not taken into account because both tenants and farmowners live in very simple mud houses. The mud houses serve as stores for the farm products as well.

ad 9. Rent

This comprises land and water rent. Now and then it happens that farmowners depend for irrigation water on owners of pumps. The rent also includes the cost which the farmer has to pay to the agents of the landowners. All rent is paid in kind.

4.11.4. *Farmer's income*

For a plausible estimate of the farmer's income a number of farmers was interviewed in each of the regions (cf. 2.5).

The number of farmer's families interviewed in percentage of the total number of farmer's families living in the area is shown as follows:

TABLE 4.16. Farmer's interviewed

| | Regions | | | | | |
|---------------|---------|-------|-------|-------|-------|-------|
| | 1 (T) | 2 (T) | 3 (F) | 4 (F) | 5 (F) | 6 (T) |
| Total present | 4,156 | 3,373 | 2,768 | 1,193 | 1,960 | 1,915 |
| Interviewed | 197 | 179 | 236 | 71 | 18 | 48 |
| % of total | 4.7 | 5.1 | 8.6 | 6.0 | 1.0 | 2.5 |

The net incomes of the farmers under consideration was calculated and is shown in table 4.17.

The data allowed to calculate the gross income derived from crops as well as from live-stock. Furthermore, the exploitation costs which are necessary to gain an income out of crops and out of live-stock could be calculated. The rent is for nearly 100% paid to the landlords to grow winter and summer crops. Although the acreage planted with summer crops is only about 15% of the area grown with winter crops, it produces nevertheless 20-30% of the income produced by the winter crops.

The figures of the gross income, the exploitation costs and the rent per farm in the six regions could be tabulated as follows:

TABLE 4.18. Gross income from crops and live-stock, exploitation costs, rent and net income, expressed in % of gross income by regions.

| | Regions | | | | | |
|---------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | 1 (T) | 2 (T) | 3 (F) | 4 (F) | 5 (F) | 6 (T) |
| Income crops | 61.2 | 71.5 | 63.6 | 55.8 | 58.4 | 65.1 |
| Income live-stock | 38.8 | 28.5 | 36.4 | 44.2 | 41.6 | 34.9 |
| Exploitation costs and rent for crops | 45.4 | 54.0 | 22.5 | 25.2 | 17.6 | 33.6 |
| Exploitation costs for live-stock | 6.9 | 6.4 | 6.4 | 9.1 | 8.1 | 5.8 |
| Net income: | | | | | | |
| from crops | 15.8 | 17.5 | 41.1 | 30.6 | 40.8 | 31.5 |
| from live-stock | 31.9 (66.8) | 22.1 (56.0) | 30.0 (42.1) | 35.1 (53.4) | 33.5 (45.6) | 29.1 (47.0) |
| Total net income: | 47.7 | 39.6 | 71.1 | 65.7 | 74.3 | 60.6 |

() live-stock in % of net income.

This table shows that the live-stock in the area is a major source of income for the farmers, especially for the tenants of region 1 (T) and 2 (T). The live-stock provides for 67% and 56% of the net income respectively, mainly due to the fact that from live-stock products practically no rent had to be paid to the landlord. In these regions the cultivation of crops contributes to a small part only in the farmer's net income. Gradually the tenants have developed a kind of mixed farming, which enables them to avoid the high rents. Apart from higher profits husbandry provides them with the necessary fats and proteins in their diet.

The larger number of water devices, which are essential instruments for many farmowners – as they are mainly living on the higher banks of the rivers – and the larger number of labourers hired, necessary for the cultivation of date-palms, cause a higher cost for implements and labour in the regions 3 (F) and 4 (F).

TABLE 4.17. Average income per farmer in ID per year per region.

| Region | 1 (T) | | 2 (T) | | 3 (F) | | 4 (F) | | 5 (F) | | 6 (T) | |
|--------------------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|
| | ID | % of gross | ID | % of gross | ID | % of gross | ID | % of gross | ID | % of gross | ID | % of gross |
| Gross income from: | | | | | | | | | | | | |
| Winter crops | 77.0 | 46.6 | 77.6 | 48.8 | 43.5 | 43.3 | 50.4 | 44.0 | 19.6 | 26.9 | 12.5 | 16.1 |
| Summer crops | 23.2 | 13.9 | 35.2 | 22.1 | 16.6 | 16.5 | 12.6 | 10.9 | 7.7 | 10.5 | 24.5 | 31.6 |
| Orchards | 1.1 | 0.7 | 1.0 | 0.6 | 3.9 | 3.8 | 1.0 | 0.9 | 15.4 | 21.0 | 13.5 | 17.4 |
| Meat | 13.2 | 7.9 | 11.1 | 7.0 | 7.8 | 7.7 | 11.2 | 9.7 | 4.3 | 5.9 | 5.2 | 6.7 |
| Milk | 45.6 | 27.6 | 29.9 | 18.8 | 25.2 | 25.1 | 35.6 | 31.0 | 23.2 | 31.8 | 19.6 | 25.2 |
| Wool, hair, eggs | 5.4 | 3.3 | 4.3 | 2.7 | 3.4 | 3.6 | 3.9 | 3.5 | 2.9 | 3.9 | 2.3 | 3.0 |
| Total gross income | 165.5 | 100 | 159.1 | 100 | 100.4 | 100 | 114.7 | 100 | 73.1 | 100 | 77.6 | 100 |
| Exploitation costs: | | | | | | | | | | | | |
| Seed | 10.4 | 6.3 | 12.0 | 7.5 | 7.6 | 7.6 | 8.2 | 7.1 | 2.8 | 3.8 | 3.3 | 4.2 |
| Depreciation of tools | 2.2 | 1.4 | 2.4 | 1.5 | 2.1 | 2.1 | 2.1 | 1.8 | 1.5 | 2.0 | 1.9 | 2.4 |
| Depreciation of animals | 1.5 | 0.9 | 1.4 | 0.9 | 1.2 | 1.2 | 1.1 | 1.0 | 0.4 | 0.5 | 0.7 | 0.8 |
| Fodder | 11.0 | 6.7 | 9.9 | 6.2 | 6.3 | 6.3 | 10.4 | 9.0 | 5.6 | 7.6 | 3.9 | 5.0 |
| Tax | 0.5 | 0.3 | 0.6 | 0.4 | 0.2 | 0.2 | 0.1 | 0.1 | — | — | 0.4 | 0.5 |
| Hired labour | 0.2 | 0.1 | 0.8 | 0.5 | 1.5 | 1.5 | 0.9 | 0.8 | 2.1 | 2.9 | 0.3 | 0.3 |
| Hired services | 7.9 | 4.7 | 7.5 | 4.7 | 5.0 | 4.9 | 5.3 | 4.6 | 0.4 | 0.5 | 0.9 | 1.1 |
| Subtotal | 33.7 | 20.4 | 34.7 | 21.7 | 23.9 | 23.8 | 28.1 | 24.4 | 12.8 | 17.3 | 11.4 | 14.3 |
| Rent | 53.1 | 31.9 | 61.7 | 38.7 | 5.1 | 5.1 | 11.7 | 10.2 | 6.2 | 8.4 | 19.5 | 25.1 |
| Total exploitation costs | 86.8 | 52.3 | 96.3 | 60.4 | 29.0 | 28.9 | 39.8 | 34.6 | 19.0 | 25.7 | 30.9 | 39.4 |
| Net income | 78.7 | 47.7 | 62.8 | 39.6 | 71.3 | 71.1 | 74.9 | 65.4 | 54.1 | 74.3 | 46.7 | 60.6 |

The cost for rent in fact is substantially higher in the regions 1 (T) and 2 (T) than in the regions 3 (F) and 4 (F). Nevertheless this does not result in a lower net income in region 1 (T) compared with regions 3 (F) or 4 (F). The system of landowners and tenants apparently does not imply in itself that the net income of tenants will be lower than the net income of farmowners. The figures stress the conclusion of JOOSTEN (27) that liquidation of big land-ownership and the partition of land under the landless farmers alone is of little value for the economic development of an area. Also his findings in the Dez area in Iran (52), which prove that the tenants of the bigger landowners had a considerable higher income than the tenants of the smaller landlords coincide with the figures found in the Hilla-Diwaniya area.

The figures show that the tenants of the big landowners, in spite of the high rents, have a higher net income than the farmowners. In the date-palm area the farmer's net income per farm is considerably lower than in the other regions. The selling price for dates is so low that a profitable existence from date-palm growing is hardly possible. A great number of people in this area goes therefore regularly to the towns to look for additional work. The investigations show that on an average a farmer's family in region 5 (F) earns 4,200 fils additional income a year, while in region 6 (T) the additional income amounts to 12,400 fils. In the other regions the additional income, about 400 fils per family, is negligible.

For a better understanding the farmer's net income has been calculated per person and per meshara under the headings farmland and cropped land in fils, as specified in the table 4.19.

In table 4.20, the gross income is further specified.

TABLE 4.19. Average net income in fils per person, per meshara farmland and per meshara cropped land by regions

| Region | Size of family | Farmland in mesharas per farm | Cropped land in mesharas per farm | Net income in fils | | |
|--------|----------------|-------------------------------|-----------------------------------|--------------------|----------------------|--------------------------|
| | | | | per person | per meshara farmland | per meshara cropped land |
| 1 (T) | 5.9 | 66 | 37.6 | 13,339 | 1,192 | 2,093 |
| 2 (T) | 6.4 | 53 | 34.7 | 9,812 | 1,184 | 1,809 |
| 3 (F) | 6.7 | 38 | 26.3 | 10,649 | 1,876 | 2,712 |
| 4 (F) | 6.0 | 44 | 27.4 | 11,891 | 1,702 | 2,368 |
| 5 (F) | 7.3 | 14 | 10.0 | 7,410 | 3,864 | 5,410 |
| 6 (T) | 7.6 | 19 | 14.0 | 6,144 | 2,457 | 3,335 |

TABLE 4.20. Average gross income in fils per labour unit, per meshara farmland, and per meshara cropped land for the various regions

| Region | Labourforce per farm | Gross income in fils | | |
|--------|----------------------|----------------------|----------------------|--------------------------|
| | | per labour unit | per meshara farmland | per meshara cropped land |
| 1 (T) | 2.5 | 66,200 | 2,507 | 4,401 |
| 2 (T) | 2.6 | 61,153 | 3,001 | 4,585 |
| 3 (F) | 2.5 | 40,160 | 2,642 | 3,817 |
| 4 (F) | 2.4 | 47,791 | 2,605 | 4,186 |
| 5 (F) | 2.3 | 31,782 | 5,221 | 7,310 |
| 6 (T) | 2.4 | 32,333 | 4,084 | 5,542 |

Table 4.19 show that, if the date-palm area is not taken into consideration, the net income per cropped meshara is higher for the farmowners than for the tenants due to the high rents the tenants have to pay to the landowners.

Table 4.20, however, reveals clearly that per meshara cropped land the tenants farm their fields more productively than the farmowners. With respect to the productivity per labour unit it can be seen that per labour unit the tenants are considerably more productive compared with the farmowners.

4.12. DIETARY HABITS AND FOOD INTAKE

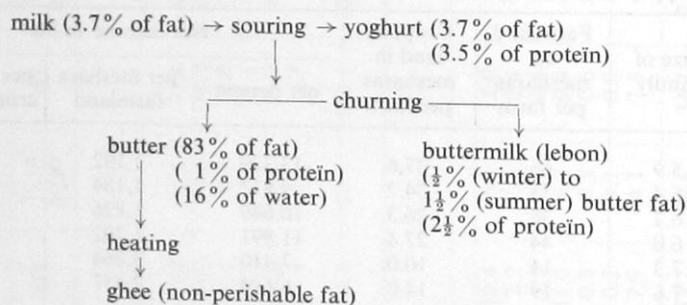
4.12.1. General

The dietary habits and the food intake of 195 farmer's families were investigated. The investigation was limited to the tenants of region 1 (T) and the farmowners of region 3 (F). Of the latter group one of every three farming families interviewed on their income was inquired about food intake in addition, totalling 81. Of the former group 114 were questioned on both subjects.

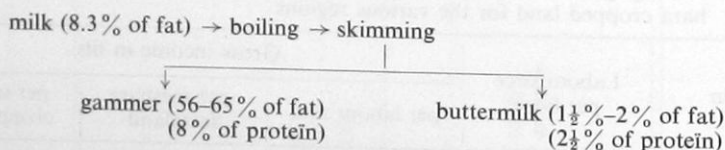
4.12.2. Dietary habits

For the greater part farmers eat cereals and dates. Barley and wheat are eaten largely in the form of unleavened bread. Rice is eaten plain, boiled in an excess of water. Greengram is mixed with the rice. The diet is fairly rich in animal products. For all important events (end of the harvest, Ramadan) sheep or lambs are killed. Farmers without live-stock usually buy their cattle meat in Hilla and Diwaniya, because this kind of meat is cheaper than mutton or goat's meat. Farmers get their ghee by churning butter out of milk. They heat the butter to evaporate the water, consequently the ghee cannot perish.

Following a scheme of this process:



The procedure for buffalo milk is somewhat different:



Vegetables are eaten in summer and winter. Many farmers dry their tomatoes, egg-plants and marrow in summer, if the crop has been abundant and does not yield a high price. In this way they get sufficient stocks for winter time. Here and there wild weeds are eaten as vegetables.

The most common beverage is hot tea, always served with much sugar.

4.12.3. Food intake

The 195 families comprise consumers, divided as follows:

| | Male | Female | Total | % of total |
|-------------------|------|--------|-------|------------|
| 0- 2 years incl. | 56 | 58 | 114 | 9.4 |
| 2-10 years incl. | 166 | 169 | 335 | 28.0 |
| over 10 years old | 371 | 377 | 748 | 62.6 |

If the consumers of each of the region 1 (T) and 3 (F) are taken into consideration the following figures result:

| | Region 1 (T) % of total | Region 3 (F) % of total |
|------------------|----------------------------|----------------------------|
| 0- 2 years incl. | 9.1 | 9.8 |
| 2-10 years incl. | 24.3 | 32.3 |
| over 10 years | 66.6 | 57.9 |

TABLE 4.21. Food intake per person per day for 195 families in the Hilla-Diwaniya area

| Products | Grams per day | Calo- ries per day | Grams of protein per day | Grams of fat per day | Grams of carbo- hydrate per day | Kilos per year | Cost in fils per year |
|----------------------|---------------------|--------------------------|-----------------------------------|----------------------------|------------------------------------------|----------------------|-----------------------------|
| Wheat | 32 | 100 | 3.2 | 0.8 | 22.4 | 11.8 | 236 |
| Barley | 112 | 379 | 11.2 | 2.2 | 78.4 | 40.9 | 409 |
| Rice | 77 | 261 | 5.8 | 0.8 | 57.6 | 28.0 | 420 |
| Greengram | 20 | 57 | 4.2 | 0.3 | 9.4 | 7.5 | 150 |
| Dates | 164 | 489 | 1.9 | — | 119.7 | 59.9 | 240 |
| Millet | 11 | 39 | 0.8 | 0.1 | 7.7 | 4.1 | 41 |
| Chicken meat | 7 | 9 | 1.4 | 0.4 | — | 2.7 | 270 |
| Meat | 20 | 55 | 5.2 | 4.5 | — | 10.5 | 735 ¹⁾ |
| Fish | 4 | 4 | 0.7 | 0.2 | — | 1.5 | 300 |
| Eggs | 3 | 5 | 0.4 | 0.3 | — | 1.1 | 176 |
| Ghee (fat) | 14 | 126 | — | 14.0 | — | 5.2 | 2,617 ²⁾ |
| Milk | 45 | 30 | 1.5 | 1.7 | 2.1 | 16.5 | 330 |
| Yoghurt | 26 | 20 | 1.3 | 1.0 | 1.6 | 9.5 | 190 |
| Lebon | 176 | 56 | 5.3 | 0.7 | 6.2 | 64.2 | — |
| Vegetables and fruit | 160 | 52 | 2.0 | 0.2 | 3.0 | 58.5 | 585 |
| Tea | 5 | — | — | — | 1.0 | 1.8 | 250 |
| Sugar | 56 | 224 | — | — | 56.0 | 20.5 | 1,435 |
| Total | — | 1,906 | 44.9 | 27.2 | 365.1 | — | 8,384 |
| Animal proteins | — | — | 16.8 | — | — | — | — |

¹⁾ Based on market price of dressed weight.

²⁾ Based on purchase price of vegetable fat.

Taking the average body-weight of the adult man on 60 kilos (keeping in mind that people in the Hilla-Diwaniya area live in a subtropical climate) a family of 6.2 persons, comprising 9.4% of 0-2 years incl., 28.0% of 2-10 years incl. and 62.6% over 10 years old, will need 13,300 calories per days according to F.A.O. standards. It was found that the 195 families in question consumed around 11,817 calories per family. Taken as a whole, it may be inferred that

the quantity of calories, proteins and fat consumed is close to the average.

Table 4.22 shows that the bulk of the food consists of cereals, dates and sugar.

TABLE 4.22. Calorie intake as derived from different sources

| Products | Calories | % Of total |
|------------------------------|----------|------------|
| Total | 1,906 | 100.0 |
| Cereals | 779 | 40.8 |
| Dates | 489 | 25.6 |
| Tea and sugar | 224 | 12.0 |
| Pulses, vegetables and fruit | 109 | 5.6 |
| Dairy products | 232 | 12.2 |
| Meat, fish and eggs | 73 | 3.8 |

It is clear that cereals and dates are very important in the diet of the farmer.

In the subsistence farming prevailing in the area the date-palm is not a cash crop, but a food crop. Moreover, a food crop which never fails to give a yield and which is therefore not risky for the farmer. The surplus of the dates of the farmowners is exchanged for grain with the tenants, who are not allowed to plant date-palms because of the land tenure rights.

4.12.4. Food intake of farmowners and tenants

In order to determine whether substantial differences between the diet of the farmowners of region 3 (F) and the tenants of region 1 (T) could be found table 4.23 was composed.

TABLE 4.23. Food intake and calories per person in region 1 (T) and 3 (F).

| Products | Region 1 (T) | | | Region 3 (F) | | |
|----------------------|---------------------------------|-----------------------------------|---------------------------------------------|---------------------------------|-----------------------------------|---------------------------------------------|
| | kilos per year per person | calories per person per day | computed expenses in fils per year | kilos per year per person | calories per person per day | computed expenses in fils per year |
| Wheat | 10.7 | 91 | 214 | 13.2 | 112 | 264 |
| Barley | 46.5 | 431 | 465 | 32.0 | 296 | 320 |
| Rice | 24.8 | 231 | 573 | 30.1 | 278 | 692 |
| Greengram | 7.5 | 57 | 150 | 7.5 | 57 | 150 |
| Dates | 54.5 | 443 | 216 | 65.1 | 531 | 260 |
| Millet | 6.1 | 67 | 61 | 2.0 | 19 | 20 |
| Chicken meat | 2.4 | 8 | 240 | 3.0 | 10 | 300 |
| Meat | 9.9 | 52 | 693 | 11.3 | 59 | 791 |
| Fish | 1.3 | 3 | 260 | 1.7 | 5 | 340 |
| Eggs | 0.9 | 4 | 153 | 1.4 | 6 | 238 |
| Ghee | 5.3 | 128 | 2,666 | 5.1 | 124 | 2,565 |
| Milk | 17.3 | 31 | 346 | 15.6 | 28 | 312 |
| Lebon | 47.2 | 39 | — | 79.4 | 69 | — |
| Yoghurt | 11.2 | 22 | 224 | 7.9 | 16 | 158 |
| Vegetables and fruit | 65.5 | 59 | 655 | 50.7 | 46 | 507 |
| Tea | 2.1 | — | 315 | 1.4 | — | 210 |
| Sugar | 24.7 | 270 | 1,729 | 15.7 | 171 | 1,099 |
| Total | — | 1,947 | 8,960 | — | 1,827 | 8,226 |

It can be said that no significant difference in the calorie intake was found. The tenants consume more sugar than the farmowners but the farmowners

consume more dates which is counterbalanced by the larger quantity of barley taken by the tenants. The tenants are obliged to buy their dates and it is therefore clear that part of the money available is spent on the purchase of sugar instead of dates. Obviously the farmowners, who generally cultivate more vegetables than the tenants, use part of this crop as a cash crop. Not much difference could be found between the protein and fat intake of both categories either, except for the item lebon which is consumed in considerably larger quantities by the farmowners, for lebon is a free product, which does not cost any money.

4.12.5. *The level of living*

According to Engel's law the percentage of income spent on food is a measure of the level of living. In low income-groups the percentage of the income spent on food is as high as 80–90%. Increase of income results in a decrease of the percentage of expenses on food, leaving an increasing percentage and an increasing amount for expenses for housing, clothing, better household articles, travelling, ceremonials, better quality food and other less essential goods (11) (49). Thus the quotient total income divided by expenses on food may be considered as a measure of the level of living in general and especially in low income regions. This factor we denote as 'W'. In case 80% of the income is spent on food $W = 1.25$, in case of 50% $W = 2.00$.

For both categories of farmers the level of living has been calculated. Figure 4.11 shows the level of living for the tenants and figure 4.12 shows the level of living for the farmowners.

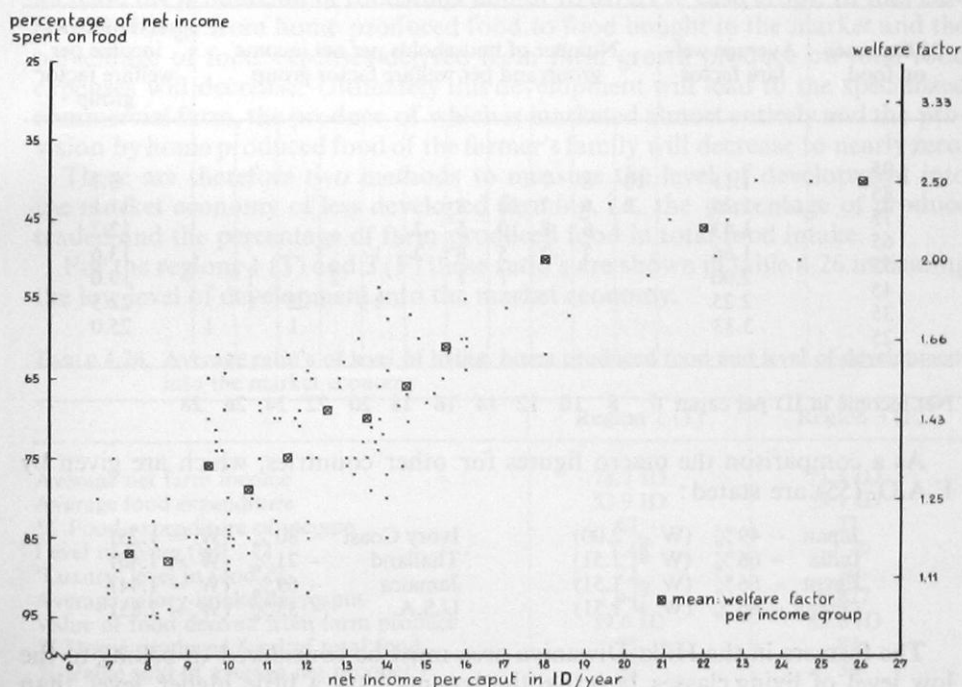


FIGURE 4.11. Level of living of tenants. Region 1 (T).

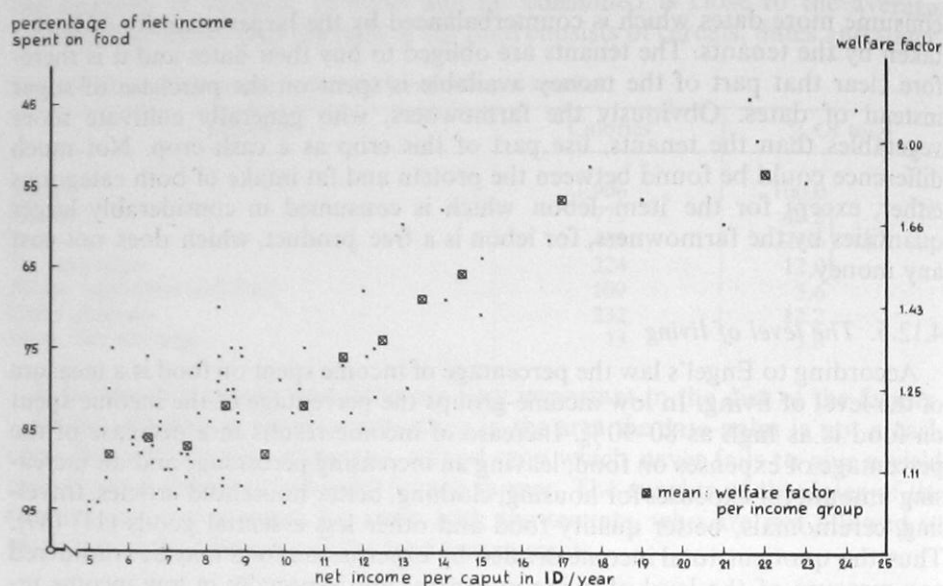


FIGURE 4.12. Level of living of farmowners. Region 3 (F).

The average net income per welfare factor group for region 1 (T) and region 3 (F) is calculated in table 4.24 and 4.25 respectively.

TABLE 4.24. Distribution of households according to net income in ID per caput and welfare factor. Region 1 (T). 114 families

| % Expenses on food. | Average welfare factor | Number of households per net income group and per welfare factor group | | | | | | | | | | | | Average net income per welfare factor group |
|---------------------|------------------------|------------------------------------------------------------------------|---|---|----|---|---|---|--|---|--|---|--|---------------------------------------------|
| 95 | | 10 | 8 | 7 | | | | | | | | | | |
| 85 | 1.11 | | 6 | 7 | 10 | 1 | | | | | | | | 8.7 |
| 75 | 1.25 | 2 | 6 | 7 | 10 | 5 | 2 | | | | | | | 11.1 |
| 65 | 1.43 | | 6 | 8 | 10 | 5 | 2 | | | | | | | 12.2 |
| 55 | 1.66 | | 3 | 2 | 5 | 8 | 2 | 1 | | | | | | 13.6 |
| 45 | 2.00 | | | | 1 | 1 | | | | | | | | 19.0 |
| 35 | 2.25 | | | | | | | 1 | | 2 | | | | 22.5 |
| 25 | 3.33 | | | | | | | | | 1 | | 1 | | 25.0 |

Net income in ID per caput 6 8 10 12 14 16 18 20 22 24 26 28

As a comparison the macro figures for other countries, which are given by F.A.O. (55) are stated:

| | | | |
|-------------|------------|-------------------|------------|
| Japan - 49% | (W = 2.00) | Ivory Coast - 80% | (W = 1.25) |
| India - 66% | (W = 1.51) | Thailand - 71% | (W = 1.40) |
| Egypt - 66% | (W = 1.51) | Jamaica - 69% | (W = 1.44) |
| Ghana - 66% | (W = 1.51) | U.S.A. - 35% | (W = 2.85) |

The farmers in the Hilla-Diwaniya area must be considered to belong to the low level of living classes, be it that the tenants have a little higher level than the farmowners.

TABLE 4.25. Distribution of households according to net income in ID per caput and welfare factor. Region 3 (F). 81 families

| % Expenses on food | Average welfare factor | Number of households per net income group and per welfare factor group | | | | | | | | | | Average net income per welfare factor group |
|--------------------|------------------------|------------------------------------------------------------------------|----|---|---|---|---|---|---|---|---|---------------------------------------------|
| 95 | 1.11 | 14 | 13 | 3 | | | | | | | | 7.0 |
| 85 | 1.25 | 5 | 15 | 6 | 7 | 1 | | | | | | 9.0 |
| 75 | 1.43 | | 1 | | 1 | 2 | | | 1 | | | 13.6 |
| 65 | 1.66 | | | | 2 | 2 | 1 | 1 | 1 | 1 | | 16.0 |
| 55 | 2.00 | | | | | | | 1 | | 2 | 1 | 21.5 |
| 45 | | | | | | | | | | | | |

Net income in ID per caput 5 7 9 11 13 15 17 19 21 23 25

4.12.6. Farm produced food and purchases of farm products

In less developed farming the main objective of the farm is the production of food for the farmer to feed himself and his family. Consequently most of the farm produce is consumed by the farmer's family and a small percentage only is sold in the market. These purchases are necessary to provide for the money needed to buy clothing, household articles, additional foodstuffs not produced on the farm and other needs.

Diversification of the needs of the farmer, meaning an increase of the level of living, is only possible if the farmer is enabled to buy the additional goods and services. That means that he has to sell more produce and that he has to increase his production of foodstuffs and/or to divert to cash crops. In that case he will change from home produced food to food bought in the market and the percentage of food expenses derived from farm grown produce on total food expenses will decrease. Ultimately this development will lead to the specialized commercial farm, the produce of which is marketed almost entirely and the provision by home produced food of the farmer's family will decrease to nearly zero.

There are therefore two methods to measure the level of development into the market economy of less developed farming, i.e. the percentage of produce traded and the percentage of farm produced food in total food intake.

For the regions 1 (T) and 3 (F) these ratio's are shown in table 4.26 indicating the low level of development into the market economy.

TABLE 4.26. Average ratio's of level of living, home produced food and level of development into the market economy

| | Region 1 (T) | Region 3 (F) |
|---------------------------------------------------|--------------|--------------|
| Average net farm income | 78.7 ID | 71.3 ID |
| Average food expenditure | 52.9 ID | 55.1 ID |
| % Food expenditure of income | 67 | 77 |
| Level of living (W) | 1.48 | 1.29 |
| 'Luxury' level in food % | 72 | 70 |
| Average calory-intake/day/caput | 1,947 | 1,827 |
| Value of food derived from farm produce | 39.6 ID | 45.6 ID |
| % Home produced food of total food | 75 | 83 |
| % Value sold of average net product ¹⁾ | 52 | 36 |

¹⁾ net product: gross minus payments in kind.

From these figures one may conclude that the tenant farmers of region 1 (T) have a higher level of living compared with the farmowners of region 3 (F). The 'luxury' in food is nearly equal, but the farmowners are still more in the subsistence economy than the tenant farmers. The luxury in food is the percentage of the expenses on food other than basic foodstuffs (grain, dates, vegetables) of the total value of food.

4.12.7. Sugar consumption

In low income countries sugar is one of the first foodstuffs to respond to a rise of income. The response of sugar to income growth appears to be greater than that of nearly all other foodstuffs. Under present dietary and other habits an upper limit to sugar consumption of about 50 kilos per caput per year seems to be the maximum. At the highest levels of income the consumption of sugar may even show a slight tendency to decline. VITON and PIGNALOSA (46) showed that the income elasticities are clearly highest for low income countries. The relation between the average net income in ID and the average consumption of sugar in kilos per caput per year is shown for tenants and farmowners and is evident from table 4.23, being respectively 1,729 fils and 24.7 kilos per year and 1,099 fils and 15.7 kilos per year.

In the figures 4.13 and 4.14 the relation between income and sugar consumption in both communities is clearly demonstrated. In these figures the S-shape of the curves is evident.

CHAPTER 5

SUBSISTENCE FARMING ASPECTS OF THE AGRICULTURE OF THE HILLA-DIWANIYA AREA

5.1. RELATIONS IN SUBSISTENCE FARMING

In a subsistence economy agriculture is the main activity of the population. In the rural areas more than 80% of the people is engaged in farming. The first aim of the farmer is to provide for the essential necessities of life: food, clothing and housing. In its most primitive form the farmer and his family produce all the goods they need. This means that the farmer's pattern of wants is very simple. His choice in goods and services is limited to those which he can produce himself, while the size of his farm will be such that its total net production will just meet his food requirements or his labour capacity.

In these economies there will be a close relation between the size of the family, the size of the farm and the productivity of the land (i.e. the yield minus seed) per unit of area. This can be formulated as follows:

$$F \cdot C = A \cdot P \cdot R \dots \dots \dots (1)$$

wherein: F = size of family in units of consumption;
 C = food consumption per unit of consumption;
 A = size of farm in units of area (gross farm area);
 P = yield of the land minus seed per unit of area;
 R = the rotation factor (cropped area/gross farm area).

sugar consumption per
caput in kilos/year

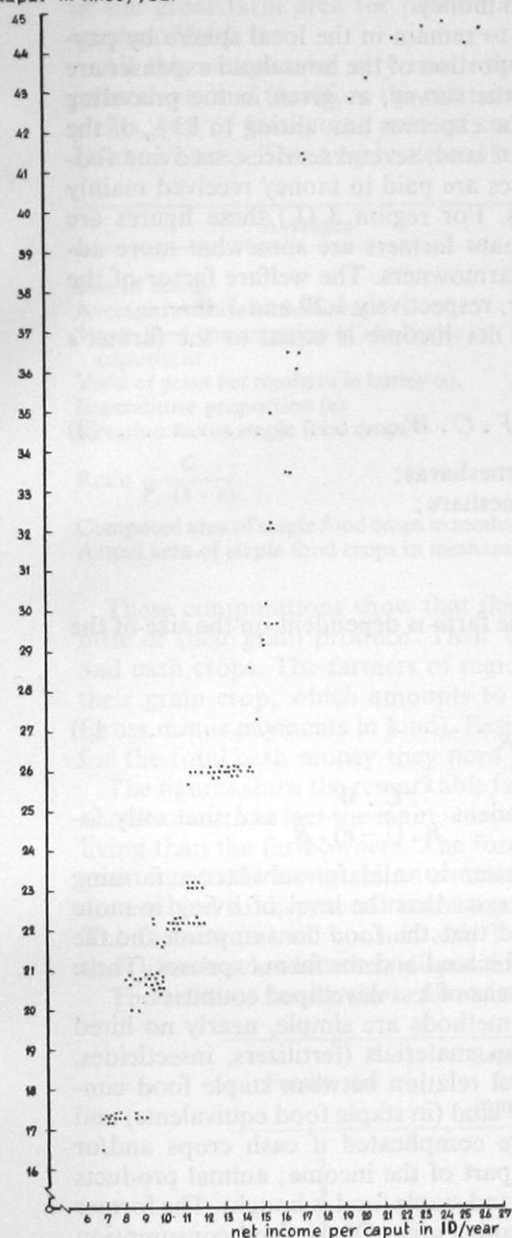


FIGURE 4.13. Relation between net income in ID per caput/year and consumption of sugar in kilos per caput per year. Region 1 (T).

sugar consumption per
caput in kilos/year

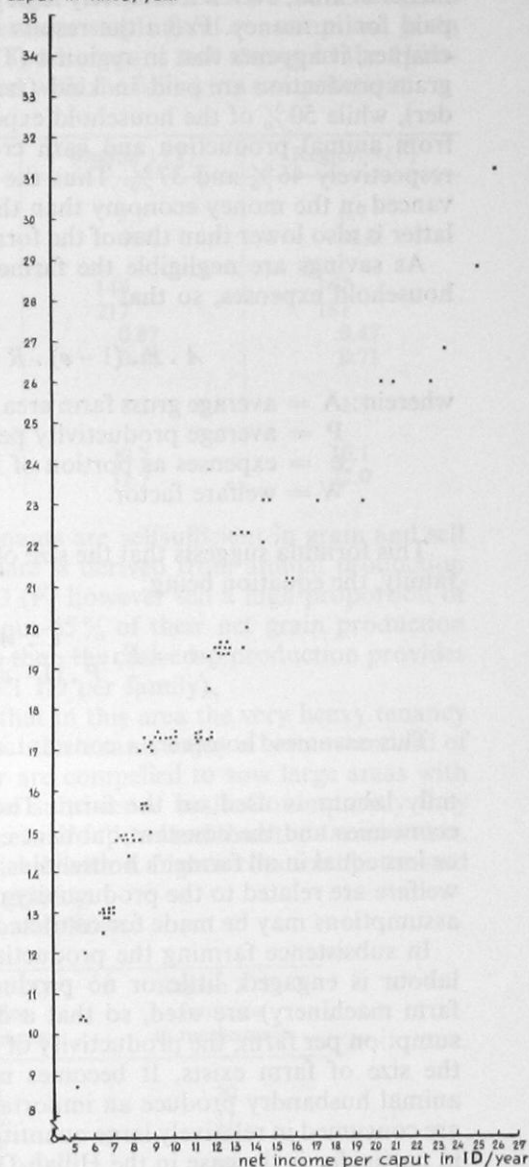


FIGURE 4.14. Relation between net income in ID per caput/year and consumption of sugar in kilos per caput per year. Region 3 (F).

In the initial stage of development the farmer will expand and diversify his wants by exchange of goods and services on payments in kind. Imported goods, however, have to be paid for in money and nowadays nearly all farming

communities are taken up more or less in an exchange economy, partly with payments in kind, partly with payments in money.

Typical is that the farm expenses tend to remain in the local sphere by payments in kind, even if a relatively high proportion of the household expenses are paid for in money. From the results of the survey, as given in the preceding chapter, it appears that in region 1 (T) the expenses amounting to 83% of the grain production are paid in kind (rent of land, several services, seed and fodder), while 50% of the household expenses are paid in money received mainly from animal production and cash crops. For region 3 (F) these figures are respectively 46% and 37%. Thus the tenant farmers are somewhat more advanced in the money economy than the farmowners. The welfare factor of the latter is also lower than that of the former, respectively 1.29 and 1.48.

As savings are negligible the farmer's net income is equal to the farmer's household expenses, so that

$$A \cdot P \cdot (1 - e) \cdot R = F \cdot C \cdot W \dots \dots \dots (2)$$

wherein: A = average gross farm area in mesharas;

P = average productivity per meshara;

e = expenses as portion of P;

W = welfare factor.

This formula suggests that the size of the farm is dependent on the size of the family, the equation being:

$$A = F \cdot \frac{C \cdot W}{P \cdot (1 - e) \cdot R} \dots \dots \dots (3)$$

This assumes, however, a constant quotient $\frac{C \cdot W}{P \cdot (1 - e) \cdot R}$ and that only family labour is used on the farm. The latter is valid for subsistence farming economies and the constant quotient expresses that the level of living is more or less equal in all farmer's households and that the food consumption and the welfare are related to the productivity of the land and the farm expenses. These assumptions may be made for restricted areas of less developed countries.

In subsistence farming the production methods are simple, nearly no hired labour is engaged, little or no production materials (fertilizers, insecticides, farm machinery) are used, so that a direct relation between staple food consumption per farm, the productivity of the land (in staple food equivalents) and the size of farm exists. It becomes more complicated if cash crops and/or animal husbandry produce an important part of the income; animal products are consumed in relatively large quantities and staple food is bought. The former in particular is the case in the Hillah-Diwaniya area. Of the food consumption only 26.0% in value is made up by basic foodstuffs (grain, vegetables and dates) in region 1 (T), and 26.6% in region 3 (F). The value of the animal products consumed (meat, milk, yoghurt and ghee) amounts to respectively 46.5% and 50.1% (4,169 fils and 4,126 fils per caput) of the total value of food intake. In the income the animal products are valued at respectively 10,880 fils and 5,433 fils per caput or 82% respectively 51% of the net income per caput. The expenditure in the animal husbandry sector comprises only 11%

respectively 10% of the gross grain production and 4.4% respectively 4.7% of the gross farm area for pasture crops. The fallow land provides the main source of feed.

All this complicates very much the simple computation of P or C in grain equivalents and therefore the relation between staple food consumption, grain yields, size of family and area of staple food crops is not strong in the Hilla-Diwaniya area. This may be demonstrated with the following computation:

| Averages | Region 1 (T) | Region 3 (F) |
|----------------------------------------------------------|--------------|--------------|
| Size of family | 5.9 | 6.7 |
| Average farmsize in mesharas | 66.0 | 32.0 |
| Staple food consumption (C) in barley eq. per caput/year | 148 | 147 |
| Yield of grain per meshara in barley eq. | 217 | 181 |
| Expenditure proportion (e) | 0.87 | 0.47 |
| Rotation factor staple food crops | 0.48 | 0.71 |
| Ratio $\frac{C}{P \cdot (1 - e)}$ | 5.2 | 1.5 |
| Computed area of staple food crops in mesharas | 30.7 | 10.1 |
| Actual area of staple food crops in mesharas | 31.7 | 27.0 |

These computations show that the tenants are selfsufficient in grain and sell little of their grain produce. Their welfare is derived from animal production and cash crops. The farmers of region 3 (F) however sell a high proportion of their grain crop, which amounts to about 65% of their net grain production (gross minus payments in kind). Besides that, the cash crop production provides for the total cash money they need (26.1 ID per family).

The figures show the remarkable fact that in this area the very heavy tenancy conditions are in fact the main reason that the tenants enjoy a better standard of living than the farmowners. The former are compelled to sow large areas with grain due to the low grain return and the subsistence basis. Consequently they are enabled to dispose of much larger areas of fallow land than the farmowners. The farmowners till considerably less land with a higher rotation factor and thus have less land at their disposal for grazing.

The relation family size – farmsize is as follows:

| Family size | Region 1 (T) farmsize in mesharas | Region 3 (F) farmsize in mesharas ¹⁾ |
|-------------|-----------------------------------------|-------------------------------------------------------|
| 2 | 43 | 20 |
| 3 | 46 | 11 |
| 4 | 49 | 19 |
| 5 | 58 | 20 |
| 6 | 67 | 25 |
| 7 | 72 | 37 |
| 8 | 77 | 39 |
| 9 | 78 | 44 |
| 10 | 82 | 57 |
| 11 | 94 | 82 |
| 12 | 100 | 88 |

¹⁾ excluding waste land and land farmed as tenant.

Besides the relation size of farm and size of family, there will be a number of other relations if the basic economy is subsistence farming. These will be examined by an analysis of the data compiled by the farm surveys in region 1 (T) and 3 (F). The relations to be examined are:

1. Farmsize and labourforce.

Assuming that the labourforce per family (without use of hired labour and machinery) will determine the area of crops which are responsible for the heaviest demand on the labourforce in a given period of the year (in the area under survey these are the winter crops) the formula will be:

$$A \cdot R_w = a + b \cdot L \quad (L = \text{labourforce}) \quad \dots \dots \dots (1)$$

Because R_w (rotation factor wintercrops) will be more or less equal in all farms within each agricultural region 1 (T) or 3 (F), the equation will be:

$$A = a + b \cdot L \quad \dots \dots \dots (2)$$

2. Yield of barley and farmsize.

This follows from equation (1):

$$P = \frac{F \cdot C \cdot W}{(1-e) \cdot R} \cdot A^{-1}$$

If $\frac{F \cdot C \cdot W}{(1-e) \cdot R}$ is constant, then the formula may be written as:

$$P = a + c \cdot A^{-1} \quad \dots \dots \dots (3)$$

3. Net income and farmsize.

The net income is the aim of the farm. Because in subsistence farming the net income $I_n = A \cdot P \cdot (1-e) \cdot R$ and because in a homogeneous farming community $P \cdot (1-e) \cdot R$ is constant, the net income equation will be:

$$I_n = a + i \cdot A \quad \dots \dots \dots (4)$$

4. Gross income and labour force.

The gross income $I_g = A \cdot P \cdot R$

$$A = a + b \cdot L$$

so that $I_g = (a + b \cdot L) P \cdot R$

or

$$I_g = a \cdot P \cdot R + b \cdot P \cdot R \cdot L$$

If $P \cdot R$ is taken constant then

$$I_g = a + g \cdot L \quad \dots \dots \dots (5)$$

5. Net income and labourforce.

The same equation shows $I_n = A \cdot P \cdot (1-e) \cdot R$

so that $I_n = (a + b \cdot L) \cdot P \cdot (1-e) \cdot R$

or

$$I_n = a + l \cdot L \quad \dots \dots \dots (6)$$

It may be noted that the factors b, p, i, g and l represent the average marginal productivity of the related production factors, being:

b : the average marginal number of mesharas per unit of labour.

p : the average marginal production per meshara.

i : the average marginal net income per meshara.

g : the average marginal gross productivity in ID per labour unit.

l : the average marginal net productivity in ID per labour unit.

5.2. FARMSIZE AND LABOURFORCE

From a number of tenants and farmowners taken at random, the relation between farmsize and labourforce was investigated and is shown in figure 5.1 and figure 5.2. The regression lines and the correlation coefficients are calculated.

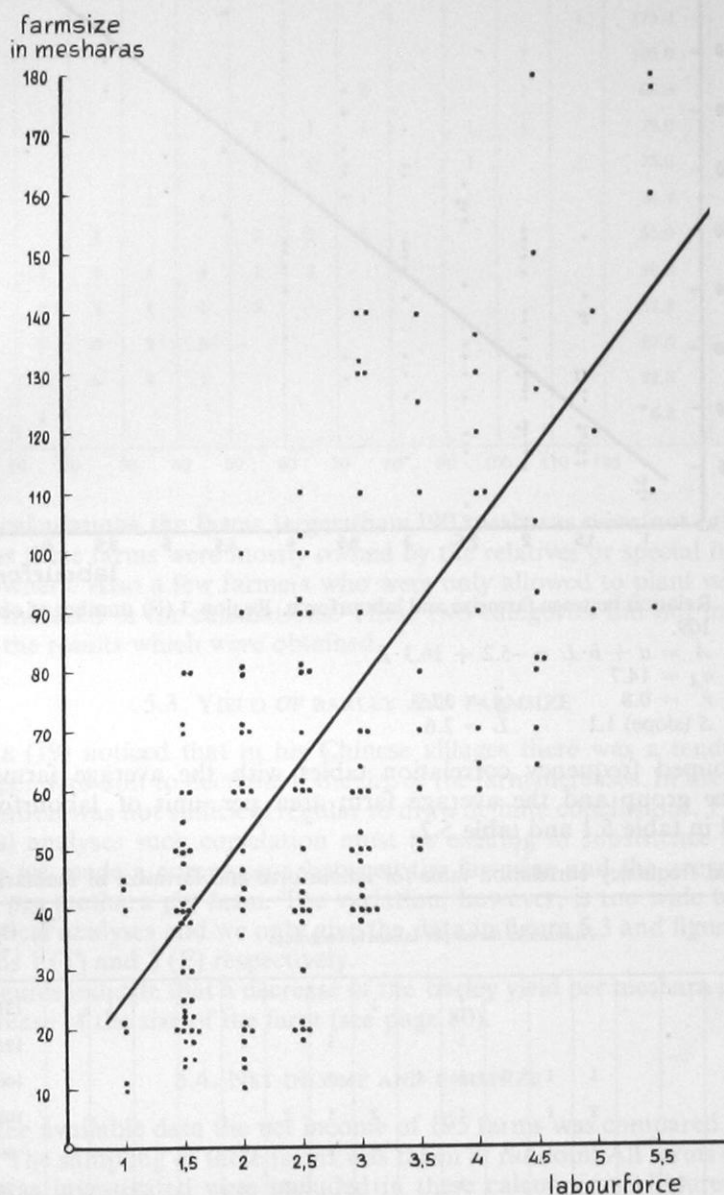


FIGURE 5.1. Relation between farmsize and labourforce. Region 1 (T) number of observations 158.

$$A = a + b \cdot L = 1.6 + 23.7 \cdot L$$

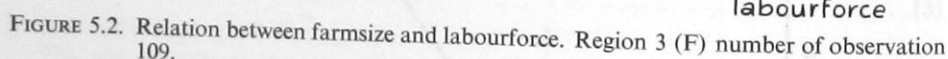
$$\sigma_A = 27.9$$

$$r = 0.7$$

$$S \text{ (slope)} = 2.0$$

$$\bar{A} = 63.5$$

$$\bar{L} = 2.6$$



$$\sigma_A = 14.7$$

$$r = 0.8$$

S (slope) 1.1

$$\bar{A} = 37.9$$

$$\bar{L} = 2.6$$

TABLE 5.1. Grouped frequency correlation table for labourforce and farmsize in mesharas, Region 1 (T).

Farm- 10 20
size in mesharas

TABLE 5.2. Grouped frequency correlation table for labourforce and farmsize in mesharas, Region 3 (F).

| Labour-force | Number of farms per labourforce group | | | | | | | | | | | Farm-size | Mesharas per labourunit |
|----------------------|---------------------------------------|----|----|----|----|----|----|----|----|-----|-----|-----------|-------------------------|
| 6.5 | | | | | | | | | | | 1 | 115.0 | 17.6 |
| 6 | | | | | | | | | | | 1 | 105.0 | 17.5 |
| 5.5 | | | | | | | | 2 | | | 1 | 85.0 | 15.4 |
| 5 | | | | | | 1 | 1 | 1 | | 1 | 1 | 79.0 | 15.8 |
| 4.5 | | | | | | 1 | 1 | | 1 | 1 | | 75.0 | 18.7 |
| 4 | | | | 1 | 4 | | 1 | 1 | | | | 50.9 | 12.7 |
| 3.5 | | | 2 | | | 2 | 2 | 2 | | | | 55.0 | 15.7 |
| 3 | | 1 | 3 | 1 | 4 | 1 | 2 | | | | | 40.8 | 13.6 |
| 2.5 | 2 | 3 | 3 | 1 | 1 | 5 | | | | | | 32.3 | 12.9 |
| 2 | | 7 | 9 | 3 | 5 | | | | | | | 27.0 | 13.5 |
| 1.5 | 1 | 9 | 6 | 4 | 1 | | | | | | | 22.6 | 15.0 |
| 1 | 7 | 1 | | | | | | | | | | 6.2 | 6.2 |
| Farmsize in mesharas | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | |

In the calculations the farms larger than 190 mesharas were not taken into account as these farms were mostly owned by the relatives or special friends of the landowners. Also a few farmers who were only allowed to plant vegetables were not included in the calculations. These two categories did not materially influence the results which were obtained.

5.3. YIELD OF BARLEY AND FARMSIZE

GAMBLE (19) noticed that in his Chinese villages there was a tendency for the yield per acre-unit to decrease if the size of the farm increases. In his example the correlation was not sufficient regular to draw definite conclusions. From our theoretical analyses such correlation must be existing in subsistence farming. Therefore we made a comparison between the farmsize and the average yield of barley per meshara per farm. The variation, however, is too wide to permit mathematical analyses and we only give the data in figure 5.3 and figure 5.4 for the regions 1 (T) and 3 (F) respectively.

Both figures indicate that a decrease of the barley yield per meshara is related to an increase of the size of the farm (see page 80).

5.4. NET INCOME AND FARMSIZE

From the available data the net income of 195 farms was compared with the farmsize. The sampling of these farms was taken at random. All farms of which the diet was investigated were included in these calculations. Figure 5.5 and figure 5.6 represent the relation between the net income and farmsize of 116 tenants of region 1 (T) and of 79 farmowners of region 3 (F) respectively. In both figures the regression lines and correlation coefficients are given. The farm-sizes are taken per farmer's family. Idle and waste lands are not taken into account.

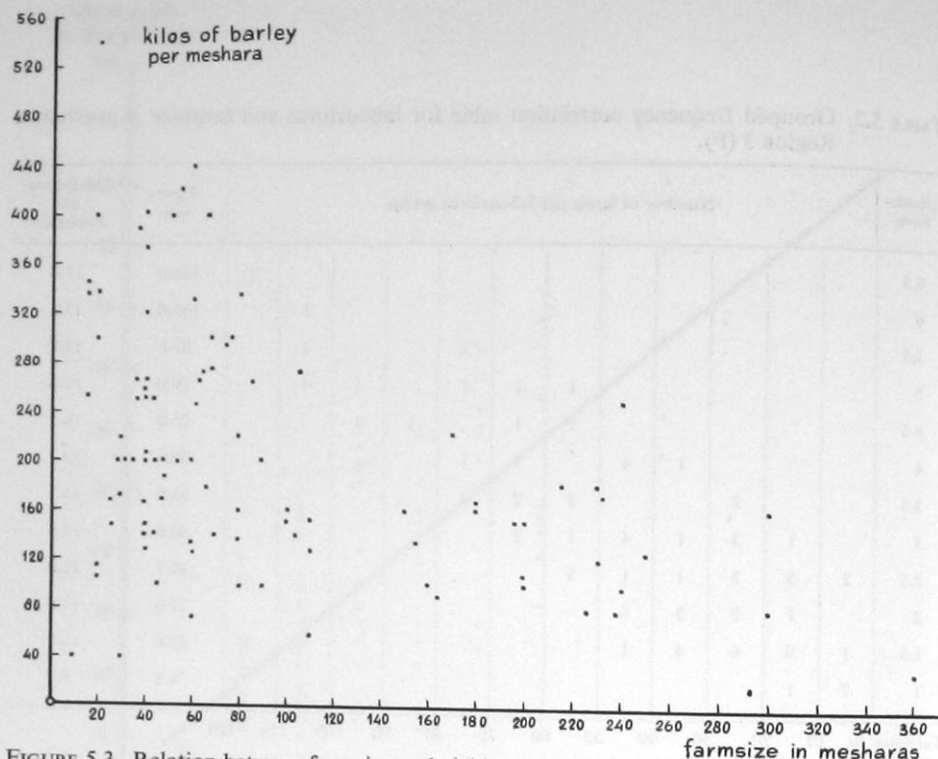


FIGURE 5.3. Relation between farm size and yield of barley in kilos per meshara. Region 1 (T).

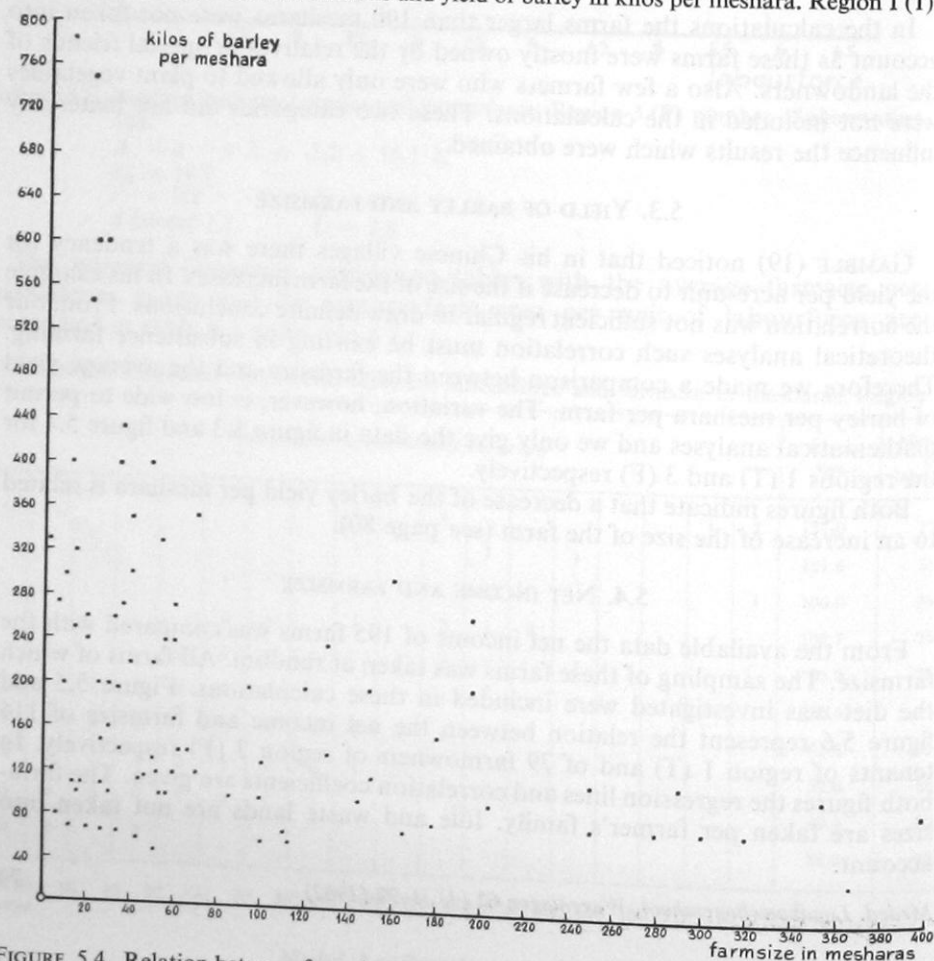


FIGURE 5.4. Relation between farm size and yield of barley in kilos per meshara. Region 3 (F).

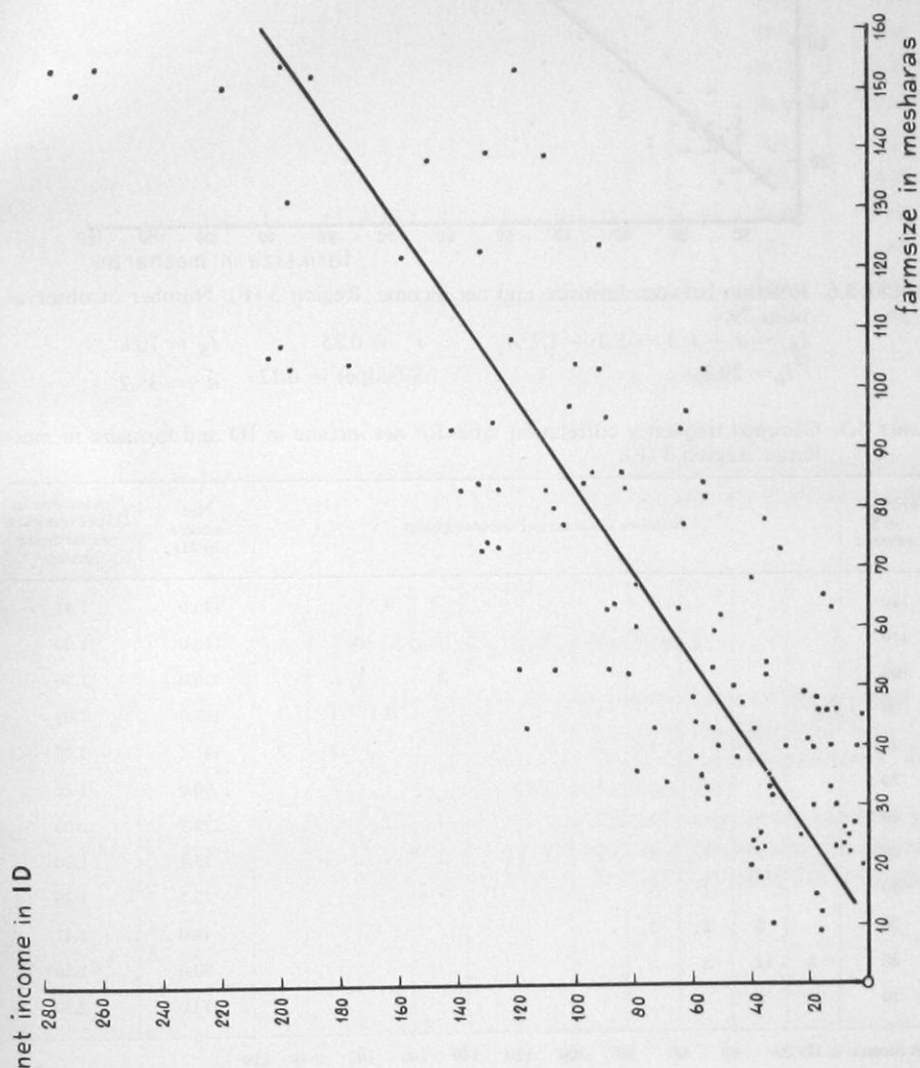
FIGURE 5.5.
Relation between farmsize and net income. Region 1 (T). Number of observations 116.

$$I_n = a + i \cdot A = -13.6 + 1.4 \cdot A$$

$$\sigma I_n = 35.7 \quad \bar{I}_n = 78.0$$

$$r = 0.8 \quad \bar{A} = 66.6$$

$$S(\text{slope}) = 0.05$$



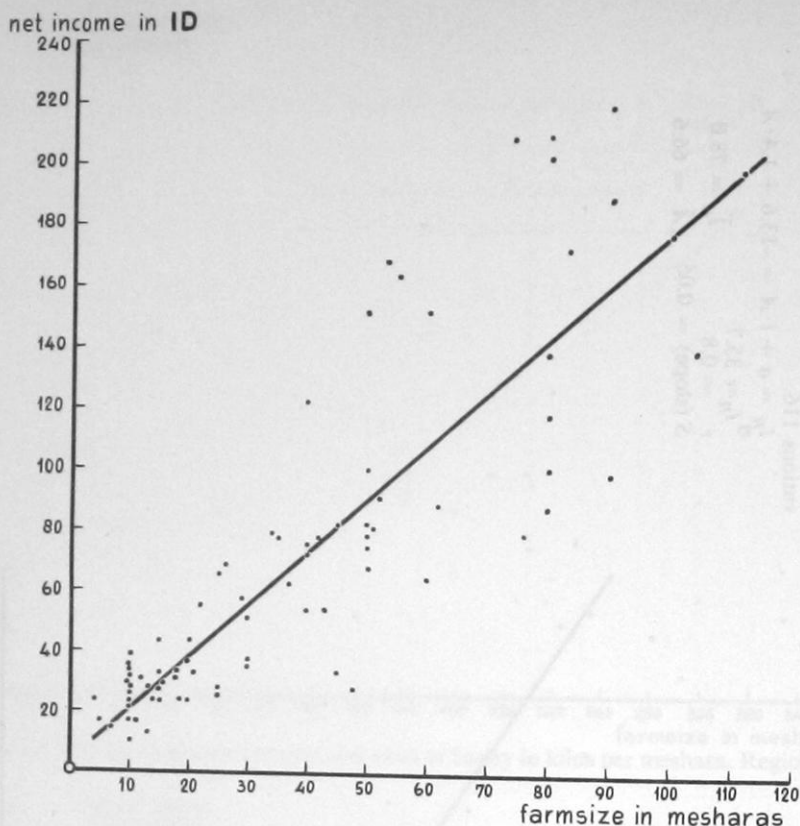


FIGURE 5.6. Relation between farm size and net income. Region 3 (F). Number of observations 79.

$$I_n = a + i \cdot A = 5.2 + 1.7 \cdot A \quad r = 0.85 \quad \bar{I}_n = 70.8$$

$$\sigma_{I_n} = 29.2 \quad S(\text{slope}) = 0.12 \quad \bar{A} = 38.2$$

TABLE 5.3. Grouped frequency correlation table for net income in ID and farm size in mesharas. Region 3 (F).

| Farmsize in mesharas | Number of farms per income group | | | | | | | | | | Net income in ID | Net income in ID per meshara per farmsize group |
|----------------------------------------------------------|----------------------------------|----|---|---|---|---|---|---|---|---|------------------------|----------------------------------------------------------|
| 120 | | | | | | | | | 1 | | 170.0 | 1.41 |
| 110 | | | | | | 1 | | | | | 110.0 | 1.00 |
| 100 | | | | | | | | 1 | | | 150.0 | 1.50 |
| 90 | | | | | 1 | | | | 1 | | 165.0 | 1.83 |
| 80 | | | | 1 | 2 | 1 | 1 | | | 1 | 141.2 | 1.76 |
| 70 | | | | | 1 | | | | | 3 | 90.0 | 1.28 |
| 60 | | | | 1 | 2 | | | 1 | 2 | | 123.3 | 2.05 |
| 50 | | 2 | 1 | 4 | 2 | 1 | | 1 | | | 75.4 | 1.50 |
| 40 | | | 1 | 5 | | | 1 | | | | 75.7 | 1.89 |
| 30 | | 5 | 3 | 2 | | | | | | | 44.0 | 1.47 |
| 20 | 2 | 12 | 2 | | | | | | | | 30.0 | 1.50 |
| 10 | 4 | 9 | | | | | | | | | 23.0 | 2.30 |
| Net income in ID 20 40 60 80 100 120 140 160 180 200 220 | | | | | | | | | | | | |

TABLE 5.4. Grouped frequency correlation table for net income in ID and farmsize in mesharas. Region 1 (T).

| Farm-size in mesharas | Number of farms per income group | | | | | | | | | | | | | | | Net income in ID | Net income in ID per meshara per farmsize group |
|-----------------------|----------------------------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|------|------------------|-------------------------------------------------|
| | 20 | 40 | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | | | |
| 160 | | | | | | 1 | | | 2 | 1 | | | 3 | 175.7 | 1.10 | | |
| 150 | | | | | | | | | | | | | 1 | 270.0 | 1.80 | | |
| 140 | | | | | 1 | 1 | 1 | | 1 | | | | | 145.0 | 1.03 | | |
| 130 | | | | 1 | | 1 | 1 | | | | | 1 | | 155.0 | 1.19 | | |
| 120 | | | | | | | | | | | | | | — | — | | |
| 110 | | | 1 | | 2 | 1 | | 1 | 2 | 1 | | | | 140.0 | 1.27 | | |
| 100 | | | | 2 | 1 | 1 | 1 | 1 | | | | | | 103.3 | 1.03 | | |
| 90 | | 2 | 2 | | 4 | 1 | 3 | | | | | | | 85.0 | 0.94 | | |
| 80 | | | | 1 | | 2 | 3 | | | | | | | 113.3 | 1.41 | | |
| 70 | 2 | 2 | 1 | 2 | 2 | | | | | | | | | 50.0 | 0.71 | | |
| 60 | | 2 | 2 | 1 | 2 | 2 | | | | | | | | 70.0 | 1.18 | | |
| 50 | 5 | 3 | 4 | 2 | | 1 | | | | | | | | 39.3 | 0.79 | | |
| 40 | 4 | 4 | 6 | 2 | | | | | | | | | | 37.5 | 0.94 | | |
| 30 | 8 | 5 | | | | | | | | | | | | 17.7 | 0.59 | | |
| 20 | 3 | 2 | | | | | | | | | | | | 18.0 | 0.90 | | |
| 10 | 1 | | | | | | | | | | | | | 10.0 | 1.00 | | |
| Net income in ID | 20 | 40 | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | | | |

The grouped frequency correlation tables with the average net income per farmsize group and the average net income per meshara per farmsize group are presented in table 5.3 and table 5.4.

5.5. GROSS INCOME AND LABOURFORCE

The relation between gross income in ID and labourforce of 99 tenants of region 1 (T) and 81 farmowners of region 3 (F) is shown in figure 5.7 and 5.8. Only farmers who were inquired about the diet were taken into account. The regression lines and the correlation coefficients are calculated.

The grouped frequency correlation tables with the average gross income per labourforce group and the average gross income per one labourunit per labourforce group are calculated in table 5.5 for region 1 (T) and in table 5.6 for region 3 (F).

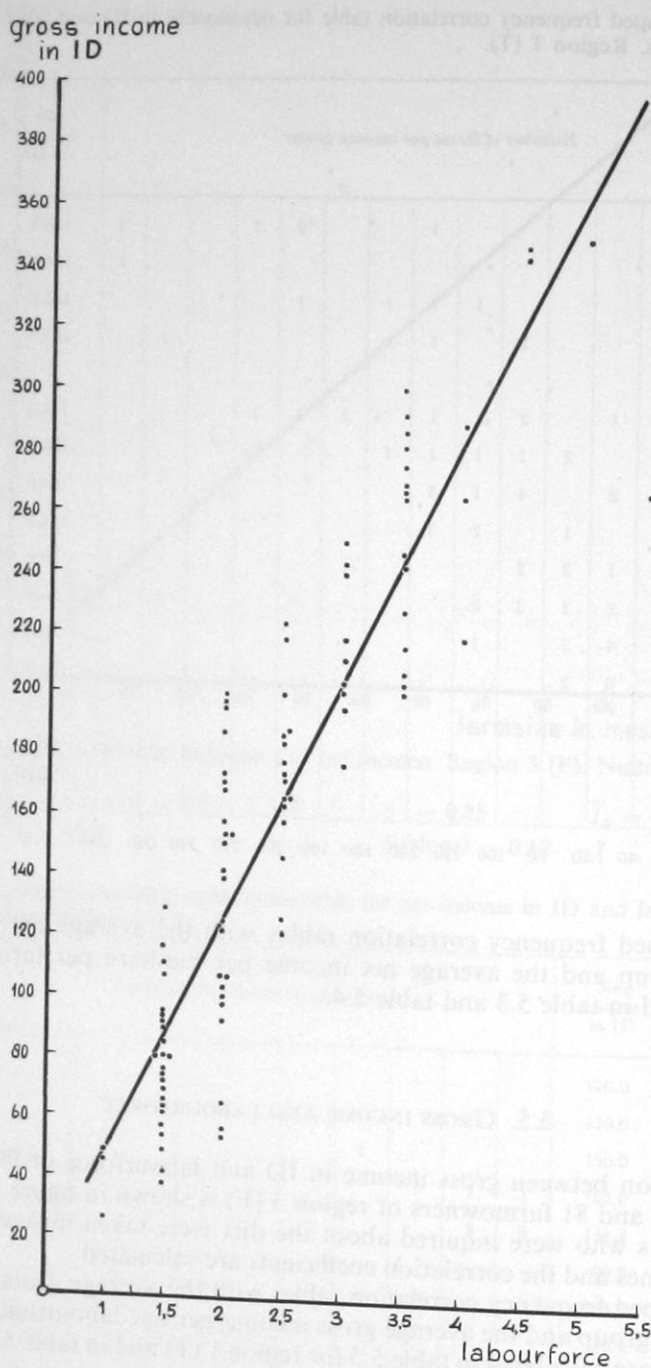


FIGURE 5.7. Relation between gross income and labour force. Region 1 (T).

$$I_g = a + g \cdot L = -30.2 + 78.8 \cdot L$$

$$\sigma_{I_g} = 33.6$$

$$r = 0.9$$

$$S(\text{slope}) = 3.5$$

$$\bar{L} = 2.4$$

$$\bar{I}_g = 160.0$$

FIGURE 5.8.
Relation between gross
income and labourforce.
Region 3 (F).

$$I_g = a + g \cdot L =$$

$$+ 4.52 + 39.8 L$$

$$r = 0.85$$

$$\bar{I}_g = 105.0$$

$$\sigma_{I_g} = 28.6$$

$$\bar{L} = 2.5$$

$$S \text{ (slope)} = 2.68$$

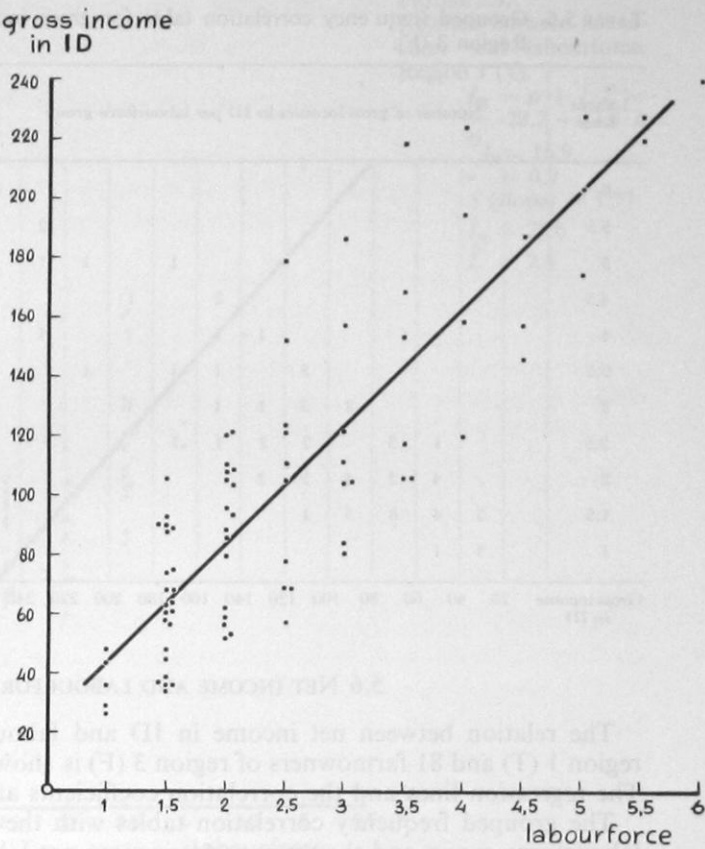


TABLE 5.5. Grouped frequency correlation table for gross income in ID and labourforce. Region 1 (T).

| Labour force | Number of gross incomes in ID per labourforce group | | | | | | | | | | | | | | | | | Gross in- come in ID | Gross income in ID per labourunit per labour force group | |
|--------------|-----------------------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|--|--|---|----------------------------|----------------------------------------------------------------------|------|
| 5.5 | | | | | | | | | | | | | 1 | | | | | 1 | 330.0 | 60.0 |
| 5 | | | | | | | | | | | | | | | | | 1 | | 350.0 | 70.0 |
| 4.5 | | | | | | | | | | | | | | | | | 1 | | 350.0 | 77.7 |
| 4 | | | | | | | | | | 1 | | | 1 | 1 | | | | | 254.0 | 63.5 |
| 3.5 | | | | | | | | | | 4 | 1 | 2 | 4 | 4 | | | | | 254.0 | 72.5 |
| 3 | | | | | | | | | 1 | 1 | 4 | 1 | 2 | | | | | | 214.4 | 71.4 |
| 2.5 | | | | | | | 2 | 2 | 6 | 3 | 2 | 1 | | | | | | | 178.7 | 67.5 |
| 2 | | | 2 | 1 | 2 | 4 | 3 | 5 | 3 | 4 | | | | | | | | | 133.3 | 66.6 |
| 1.5 | 1 | 4 | 7 | 8 | 3 | 1 | | | | | | | | | | | | | 75.0 | 50.0 |
| 1 | 1 | 2 | | | | | | | | | | | | | | | | | 43.3 | 43.3 |

Gross 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400
income in ID

TABLE 5.6. Grouped frequency correlation table for gross income in ID and labourforce Region 3 (F).

| Labour force | Number of gross incomes in ID per labourforce group | | | | | | | | | | | | | Gross income in ID | Gross income in ID per labourunit per labourforce group |
|--------------------|-----------------------------------------------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------------------|---------------------------------------------------------|
| 6 | | | | | | | | | | | | | 1 | 250.0 | 41.6 |
| 5.5 | | | | | | | | | | | | | 2 | 220.0 | 41.8 |
| 5 | | | | | | | | | 1 | | 1 | 1 | | 203.3 | 40.6 |
| 4.5 | | | | | | | | 2 | | 1 | | | | 163.3 | 36.2 |
| 4 | | | | | | | 1 | 1 | | 1 | | 1 | | 175.0 | 43.7 |
| 3.5 | | | | | | 3 | | 1 | 1 | | 1 | | | 143.3 | 40.6 |
| 3 | | | | | 2 | 3 | 1 | 1 | | 1 | | | | 122.5 | 40.8 |
| 2.5 | | | 1 | 3 | | 2 | 2 | 1 | 1 | | | | | 106.0 | 42.4 |
| 2 | | | 4 | 2 | 4 | 5 | 2 | | | | | | | 88.8 | 44.4 |
| 1.5 | | 5 | 4 | 8 | 5 | 1 | | | | | | | | 63.9 | 42.6 |
| 1 | | 3 | 1 | | | | | | | | | | | 35.0 | 35.0 |
| Gross income in ID | 20 | 40 | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | | |

5.6 NET INCOME AND LABOURFORCE

The relation between net income in ID and labourforce of 99 tenants of region 1 (T) and 81 farmowners of region 3 (F) is shown in figure 5.9 and 5.10. The regression lines and the correlation coefficients are calculated.

The grouped frequency correlation tables with the average net income per labourforce group and the average net income per labourunit per labourforce group are calculated in table 5.7 for region 1 (T) and table 5.8 for region 3 (F).

TABLE 5.7. Grouped frequency correlation table for net income in ID and labourforce. Region 1 (T).

| Labourforce | Number of net incomes in ID per labourforce group | | | | | | | | | | | | | Net income in ID | Net income in ID per labourunit per labourforce group |
|------------------|---------------------------------------------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------------------|-------------------------------------------------------|
| 5.5 | | | | | | | | | | | | | 1 | | 45.5 |
| 5 | | | | | | | | | | | | | 2 | 210.0 | 42.0 |
| 4.5 | | | | | | | | 1 | | | | 1 | | 180.0 | 40.0 |
| 4 | | | | | | | 2 | | | | | | | 120.0 | 30.0 |
| 3.5 | | | | | 2 | 5 | 5 | | 2 | | | | | 124.4 | 35.8 |
| 3 | | | | 3 | 3 | 2 | 1 | | | | | | | 93.3 | 31.1 |
| 2.5 | | | 1 | 5 | 5 | 5 | | | | | | | | 87.5 | 35.0 |
| 2 | | 4 | 7 | 12 | | | | | | | | | | 56.9 | 28.4 |
| 1.5 | | 16 | 9 | 1 | | | | | | | | | | 38.4 | 26.2 |
| 1 | | 3 | | | | | | | | | | | | 30.0 | 30.0 |
| Net income in ID | 20 | 40 | 60 | 80 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | | |

net income in ID

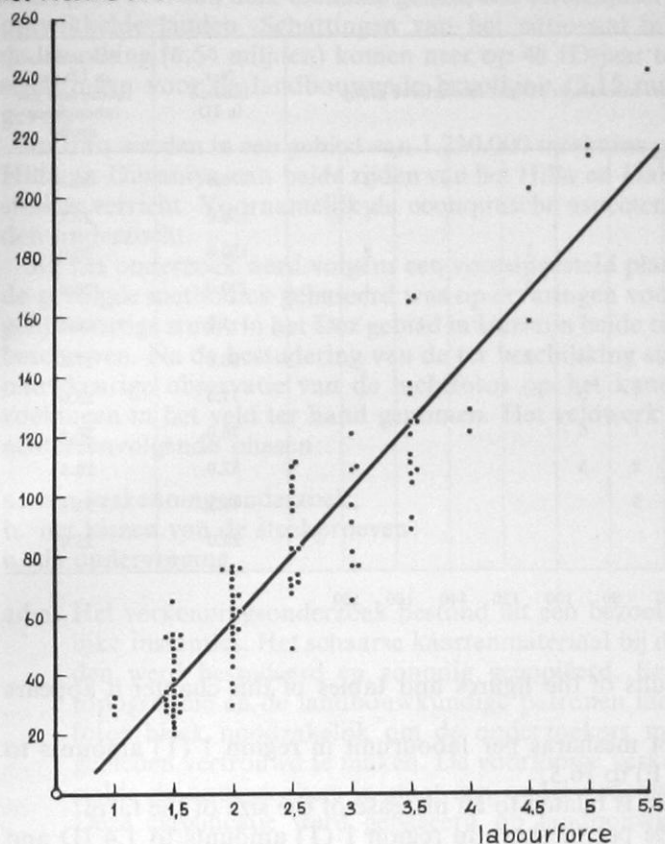


FIGURE 5.9.

Relation between net income and labourforce. Region 1 (T).

$$I_n = a + I \cdot L = -28.2 + 43.8 \cdot L$$

$$\sigma_{I_n} = 16.9$$

$$r = 0.9$$

$$S \text{ (slope)} = 1.77$$

$$\bar{I}_n = 77.6$$

$$\bar{L} = 2.4$$

net income in ID

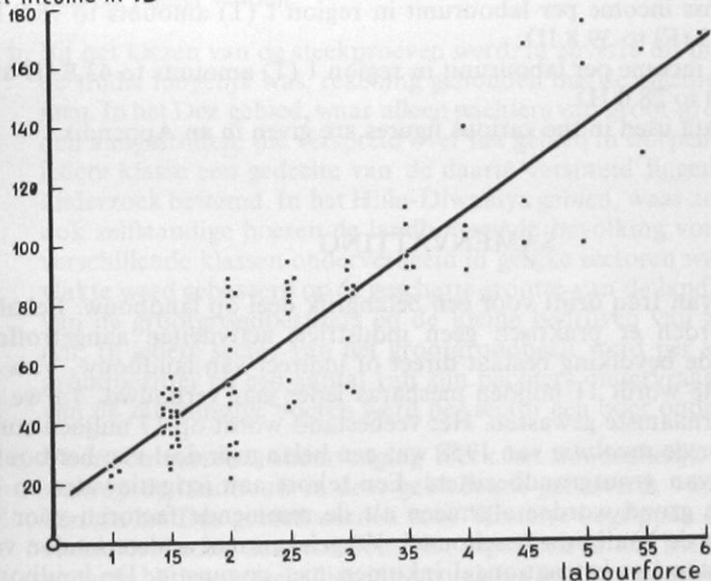


FIGURE 5.10.

Relation between net income and labourforce. Region 3 (F).

$$I_n = a + I \cdot L = -0.4 + 28.0 \cdot L$$

$$\sigma_{I_n} = 17.1$$

$$r = 0.9$$

$$S \text{ (slope)} = 1.6$$

$$\bar{I}_n = 70.5$$

$$\bar{L} = 2.5$$

TABLE 5.8. Grouped frequency correlation table for net income in ID and labourforce. Region 3 (F).

| Labour-force | Number of net incomes in ID per labourforce group | | | | | | | | | | Net income in ID | Net income in ID per labourunit per labourforce group |
|------------------|---------------------------------------------------|----|----|----|----|-----|-----|-----|-----|-----|------------------|-------------------------------------------------------|
| 6 | | | | | | | | | 1 | | 170.0 | 28.3 |
| 5.5 | | | | | | | 1 | | 1 | | 150.0 | 27.2 |
| 5 | | | | | | 1 | | | 2 | | 150.0 | 30.0 |
| 4.5 | | | | | | 2 | | | 1 | | 130.0 | 28.8 |
| 4 | | | | | 1 | 2 | | 1 | | | 115.0 | 28.7 |
| 3.5 | | | | | 4 | 2 | | | | | 96.6 | 27.6 |
| 3 | | | 2 | 1 | 5 | | | | | | 77.5 | 25.6 |
| 2.5 | | | 3 | 1 | 6 | | | | | | 76.0 | 30.4 |
| 2 | | 6 | 4 | 2 | 5 | | | | | | 57.0 | 28.5 |
| 1.5 | | 8 | 9 | 5 | | | | | | | 47.2 | 31.4 |
| 1 | 1 | 3 | | | | | | | | | 25.0 | 25.0 |
| Net income in ID | 10 | 20 | 40 | 60 | 80 | 100 | 120 | 140 | 160 | 180 | | |

Summarizing the results of the figures and tables of this chapter it appears that:

the marginal number of mesharas per labourunit in region 1 (T) amounts to 23.7 and in region 3 (F) to 16.3;

a decrease of barley yield is related to an increase of the size of the farm;

the marginal net income per meshara in region 1 (T) amounts to 1.4 ID and in region 3 (F) to 1.7 ID;

the marginal gross income per labourunit in region 1 (T) amounts to 78.8 ID and in region 3 (F) to 39.8 ID;

the marginal net income per labourunit in region 1 (T) amounts to 43.8 ID and in region 3 (F) to 28.0 ID.

The original data used in the various figures are given in an Appendix.

SAMENVATTING

De economie van Iraq drijft voor een belangrijk deel op landbouw. Behalve olie-winning worden er praktisch geen industriële activiteiten aangetroffen. Rond 80% van de bevolking bestaat direct of indirect van landbouw. Van de totale oppervlakte wordt 11 miljoen mesharas ieder jaar verbouwd. Tarwe en gerst zijn de voornaamste gewassen. Het veebestand wordt op 17 miljoen stuks geschat. Tot voor de revolutie van 1958 was een belangrijk deel van het bouwland in handen van grootgrondbezitters. Een tekort aan irrigatiewater en de verzilting van de grond worden algemeen als de remmende factoren voor de ontwikkeling van de landbouw beschouwd. Vergeleken met andere landen van het Midden Oosten ligt het nationaal inkomen niet ongunstig. De landbouw

heeft geen deel aan deze toename gehad, een verschijnsel opvallend voor minder ontwikkelde landen. Schattingen van het nationaal inkomen per hoofd van de bevolking (6,54 miljoen) komen neer op 48 ID/jaar terwijl overeenkomstige schattingen voor de landbouwende bevolking (5,15 miljoen) 36 ID/jaar aan geven.

In Iraq werden in een gebied van 1.230.000 mesharas gelegen tussen de steden Hilla en Diwaniya aan beide zijden van het Hilla en Dahghara kanaal bedrijfsstudies verricht. Voornamelijk de economische aspecten van de bedrijven werden onderzocht.

Bij het onderzoek werd volgens een vooropgesteld plan te werk gegaan. Daar de gevolgde methodiek gebaseerd was op ervaringen voorheen opgedaan in een gelijksoortige studie in het Dez gebied in Iran zijn beide onderzoeksmethodieken beschreven. Na de bestudering van de ter beschikking staande literatuur en een nauwkeurige observatie van de luchtfotos op het kantoor werden de onderzoeken in het veld ter hand genomen. Het veldwerk werd ingedeeld in drie achtereenvolgende fasen:

- a. een verkenningsonderzoek;
- b. het kiezen van de steekproeven;
- c. de ondervraging.

ad a. Het verkenningsonderzoek bestond uit een bezoek aan de officiële plaatselijke instanties. Het schaarse kaartenmateriaal bij deze instanties voorhanden werd bestudeerd en zonodig gecopiëerd. Een bestudering van de topographie en de landbouwkundige patronen met behulp van de luchtfotos bleek noodzakelijk om de onderzoekers met de te onderzoeken gebieden vertrouwd te maken. De voorlopige verkenning van de gebieden stelde de onderzoekers in staat een onderverdeling in klassen te maken. Deze classificatie werd gebaseerd op landbouwkundige patronen. Een verdere indeling naar gebieden met dezelfde grondbezitsvormen kon daarna plaats vinden.

ad b. Bij het kiezen van de steekproeven werd, in zoverre dit in de aanvang van de studie mogelijk was, rekening gehouden met de algemeen erkende normen. In het Dez gebied, waar alleen pachters van groot-grondbezitters werden aangetroffen, die verspreid over het gebied in dorpen wonen, werd in iedere klasse een gedeelte van de daarin verspreid liggende dorpen voor onderzoek bestemd. In het Hilla-Diwaniya gebied, waar zowel pachters als ook zelfstandige boeren de landbouwende bevolking vormen, werden de verschillende klassen onderverdeeld in gelijke sectoren waarvan de oppervlakte werd gebaseerd op de geschatte grootte van de landbouwbezittingen van de grootgrondbezitters en de kleine bedrijven van zelfstandige boeren. In iedere sector van het grootgrondbezit werd per sector een grootgrondbezitter en een aantal van zijn pachters ondervraagd. In het gebied van de zelfstandige boeren werd per sector een boer ondervraagd.

ad c. Voor een correcte ondervraging bleek het noodzakelijk enkele principes waarop de landbouw in deze gebieden is gebaseerd, vooraf te onderzoeken. In het Dez gebied werden voor Westerse begrippen ongewone oppervlakte eenheden aangetroffen. Het algemeen in het Midden Oosten toegepaste Niren-systeem ligt ten grondslag aan het vruchtwisselingsstelsel.

Ook in het Hilla-Diwaniya gebied bleek inzicht in de denkwijze een de praktijken van de boeren noodzakelijk voor een succesvolle ondervraging. Vragen over opbrengsten, melkproducties, vruchtwisselingstelsels en voedselopname moesten zodanig aan de boeren worden gesteld, dat zij voor hen bevattelijk waren. Een voortdurende controle op de antwoorden was essentieel.

De verzamelde gegevens werden achtereenvolgens gecodeerd, geklassificeerd en getabuleerd. Het voordeel van het verwerken van de cijfers op deze manier maakte het mogelijk het verzamelde materiaal in kwantitatieve cijfers weer te geven. Om deze kwantitatieve benadering te vergemakkelijken, werden vraagformulieren samengesteld. Echter ook alle andere gegevens werden genoteerd. In totaal werden 852 grootgrondbezitters pachters en boeren in het Hilla-Diwaniya gebied ondervraagd. Van 195 boeren en pachters werd bovendien een gedetailleerd voedselonderzoek verricht.

De classificatie van beide gebieden vormt een apart onderwerp van behandeling. In het Dez gebied is het grondbezit gebaseerd op aandelen in de produktie van de velden behorende bij een dorp. De grondbezitters werden in drie klassen onderverdeeld: grondbezitters met meer dan vier dorpen in aandelenbezit, grondbezitters met 1 tot 4 dorpen in aandelenbezit en grondbezitters met slechts een gedeelte van een dorp in bezit. Aan de classificatie van het Hilla-Diwaniya gebied ging een studie van de verschillende vormen van menselijke nederzettingen vooraf. De bestudering van deze nederzettingen aan de hand van luchtfoto's maakte duidelijk, dat er naast grote steden en plaatselijke handelscentra dorpen van pachters en alleenstaande bedrijven van zelfstandige boeren voorkwamen. De pachters werden onderverdeeld in twee groepen, zij die de velden bebouwen van grootgrondbezitters met bezittingen groter dan 4000 mesharas en zij die de velden bebouwen van grondbezitters met bezittingen kleiner dan 4000 mesharas. De zelfstandige boeren konden worden onderverdeeld in een groep, die hun bedrijf alleen of in samenwerking met enkele anderen bebouwen en een groep, die communaal de velden behorende bij een dorp bebouwen. Een klein gedeelte van het gebied wordt bewoond door pachters en boeren die zich voornamelijk met de dadelcultuur bezig houden. Het Hilla-Diwaniya areaal kon aldus worden onderverdeeld in zes specifieke landbouwkundige regionen en wel als volgt:

- Region 1. deelbouwers van landheren met landerijen > 4000 mesharas.
- Region 2. deelbouwers van landheren met landerijen < 4000 mesharas.
- Region 3. zelfstandige boeren.
- Region 4. zelfstandige boeren die communaal hun velden bebouwen.
- Region 5. zelfstandige boeren in het dadelgebied.
- Region 6. deelbouwers in het dadelgebied.

De grond van het Hilla-Diwaniya gebied gelegen in de Mesopotamië vlakte, die zich door een droog klimaat kenmerkt, is opgebouwd uit fluviatiele afzettingen. De vruchtbaarheid van de bodem is laag en grote gedeelten van het gebied zijn sterk verzilt. Administratief behoort het gebied gedeeltelijk tot het Hilla district en gedeeltelijk tot het Diwaniya district. De landbouwdienst, het onderwijsdepartement en de gezondheidsdienst hebben respectievelijk verschillende onderafdelingen, scholen en hospitalen onder hun beheer.

Rond 75% van het gebied is door pachters bevolkt, terwijl de zelfstandige

boeren slechts 25% van het gebied bewonen. De gemiddelde bevolkingsdichtheid is 26 per km². Ongeveer 85% van de plattelandsbevolking is direct van landbouw afhankelijk. 14% is er indirect van afhankelijk en slechts 1% heeft een beroep buiten de landbouw. Er heerst in het gebied ernstige seizoenswerkloosheid omdat tengevolge van gebrek aan irrigatiewater slechts een beperkt rotatieschema mogelijk is en omdat andere werkmogelijkheden dan landbouw ontbreken.

Het cultuurstelsel is gebaseerd op het Niren-systeem, een systeem waarbij in principe in de winter 50% van het bebouwbaar areaal braak ligt en 50% wordt bebouwd. Een klein gedeelte van het areaal in de winter bebouwd, wordt in de zomer gebruikt voor zomergewassen.

De voornaamste wintergewassen zijn gerst en tarwe. Het landgebruik is als volgt:

| | Totaal areaal als 100% | Bebouwbaar areaal als 100% |
|-----------------------------|---------------------------|-------------------------------|
| Niet geschikt voor landbouw | 50.2 | — |
| Winter: Braak | 20.4 | 40.9 |
| Bebouwd | 29.3 | 59.1 |
| Zomer: Braak | 43.6 | 87.2 |
| Bebouwd | 6.3 | 12.8 |

Uit het cijfermateriaal blijkt voorts dat in de gebieden van de zelfstandige boeren circa 20% van het bebouwbaar areaal iedere winter wordt ingezaaid. Tengevolge van verzilting van de bodem zijn de bedrijven te klein en levert het volgen van het zuivere Niren-systeem niet voldoende produktie. Teneinde het cultuurstelsel vast te stellen was een onderzoek naar zaai- en oogstdata van de verscheidene gewassen noodzakelijk. De cultuur-methoden van de in het gebied voorkomende gewassen werden bestudeerd. Er wordt maar zeer oppervlakkig geploegd en alle gewassen worden breedwerpig ingezaaid. Teneinde gras- en onkruidopslag als voeding voor het vee te bevorderen, worden de stoppels van de geogoste gewassen niet direct ondergeploegd. Meestal vindt dit ploegen een jaar later plaats. Alleen wat betreft groenten kan een intensieve en extensieve cultuur-methode worden onderscheiden. De intensieve methode wordt gevolgd door de boeren in de buurt van de grotere bevolkingscentra. Hier immers is men verzekerd van de afzet van kwaliteitsgroenten. De verbouw van groenten in het winterseizoen vereist bovendien bepaalde voorzorgsmaatregelen.

Dadeltuinen worden voornamelijk rond de stad Hilla en ten zuiden van deze stad aan weerszijden van het Hilla-kanaal aangetroffen. Ofschoon de dadelprijs zeer laag is vindt men nog veel jonge aanplant daar dadels een belangrijk onderdeel van het voedsel van de boeren vormt. De verzorging van de aanplant en de oogst vereist veel arbeid.

De opbrengsten van de gewassen zijn over het geheel genomen laag, speciaal in de gebieden van de zelfstandige boeren waar het Niren-systeem plaats heeft moeten maken voor een meer intensief rotatieschema.

De veeteeltpopulatie in het gebied bestaat voornamelijk uit paarden, ezels, koeien en schapen. Vele boeren zijn slechts aandeelhouder van een paard daar zij financieel niet voldoende krachtig zijn het alleen-bezit te verwerven. Een aandeel geeft evenwel het recht om over het paard te beschikken. De cijfers tonen aan dat de gemiddelde veebezetting per bedrijf 2 koeien en 10 schapen

telt. Per stuk vee is $1\frac{1}{4}$ hectare van het totaal areaal als graasland beschikbaar. De voornaamste bron van voer zijn de braakgronden. Sommige boeren staan het vee toe jonge gerst te grazen. Ook worden – zij het op beperkte schaal – braaklanden geïrrigeerd teneinde de gras-en onkruidgroei te bevorderen. Bijvoering met gerst is noodzakelijk in de winter als er niet voldoende braak voorhanden is en dit speciaal in de gebieden waar het Niren-systeem is verlaten. De melkopbrengsten voornamelijk van schapen en geiten zijn laag. Deze dieren worden voornamelijk voor vleesproductie gehouden.

Practisch alle grootgrondbezitters namen actief deel in het beheer van hun landerijen. Zij werden hierin terzijde gestaan door agenten. Het oogstaandeel dat de pachter aan de grootgrondbezitter moest betalen was hoog. Deze betaling geschiedde in natura en werd voornamelijk van de geoogste gewassen geheven. Ieder jaar werden de te bebouwen velden aan de pachters door loting toebedeeld.

In tegenstelling tot de pachters zijn de zelfstandige boeren wettelijke bezitters van hun velden. Bezitsverhoudingen kunnen onderling bijzonder gecompliceerd zijn.

De bedrijfsgrootte ziet er in de verschillende gebieden als volgt uit:

| Gebied | In hect. per familie | Hect. ieder jaar geoogst gewas | Hect. braak | Hect. niet voor landbouw geschikt |
|--------|-------------------------|-----------------------------------|----------------|-----------------------------------------|
| 1 | 16,50 | 9,40 | 8,25 | |
| 2 | 13,25 | 8,80 | 5,75 | |
| 3 | 13,50 | 5,80 | 3,50 | 4,00 |
| 4 | 12,00 | 6,50 | 5,00 | 1,00 |
| 5 | 4,00 | 2,50 | 1,25 | 0,50 |
| 6 | 4,75 | 3,50 | 1,50 | |

De bruto- en netto-inkomsten van pachters en zelfstandige boeren werden berekend uit de inkomsten van gewassen en vee en uit de exploitatiekosten inclusief de pacht. Om de cijfers onderling te vergelijken was het noodzakelijk alle inkomsten en uitgaven uit te drukken in geld, ook indien betaling in natura plaats vond. Voor alle produkten werd de prijs af boerderij in rekening gebracht. De exploitatiekosten bestaan uit zaad, afschrijvingen van werktuigen en vee, kosten van veevoer, gehuurde arbeid, gehuurd dienstbetoon, bedrijfsgebouwen, giften aan godsdienstige instellingen en pachten. Inkomsten en uitgaven worden in de volgende tabel weergegeven in Iraqi Dinar (één Iraqi Dinar is één Engels pond).

| Gebied | 1 | 2 | 3 | 4 | 5 | 6 |
|-----------------------------------|------------|------------|------------|------------|------------|------------|
| Bruto inkomen | 165,5 | 159,1 | 100,4 | 114,7 | 73,1 | 77,6 |
| Exploitatie kosten incl. pacht | 86,8(52,3) | 96,3(60,4) | 29,0(28,9) | 39,8(34,6) | 19,0(25,7) | 30,9(39,4) |
| Pacht | 53,1(31,9) | 61,6(38,7) | 5,1(5,1) | 11,7(10,2) | 6,2(8,4) | 19,5(25,1) |
| Netto inkomen | 78,7(47,7) | 62,8(39,6) | 71,3(71,1) | 74,9(65,4) | 54,1(74,3) | 46,7(60,6) |
| Waarvan uit: | | | | | | |
| gewassen | 15,8 | 17,5 | 41,1 | 30,6 | 41,2 | 35,3 |
| vee | 31,9 | 22,1 | 30,0 | 35,1 | 34,3 | 30,4 |

() percentage van bruto inkomen.

Ofschoon de pachten van de pachtbedrijven aanmerkelijk hoger lagen konden er geen grote verschillen tussen de netto-inkomsten van pachter en zelfstandige boeren worden vastgesteld. Voorts bleek dat de inkomsten uit vee voor een groot gedeelte tot het netto-inkomen bijdragen voornamelijk in de pachtbedrijven.

De berekeningen tonen aan dat de produktiviteit per meshara bebouwd land hoger ligt voor de pachtbedrijven dan voor de zelfstandige bedrijven. Ook de produktiviteit per arbeidskracht per jaar ligt in de pachtbedrijven aanmerkelijk hoger. De marginale bruto produktiviteit per arbeidskracht bedraagt voor de deelhouders 78.8 ID, voor de zelfstandige boeren 39.8 ID. De marginale netto produktiviteit bedraagt respectievelijk 43.8 ID en 28.0 ID.

De harde pachtcondities zijn er oorzaak van dat de pachter een betere levensstandaard bezitten dan de zelfstandige boeren.

Een gedeelte van de onderzochte boeren werd ondervraagd naar hun eetgewoonten en voeding. Er werd berekend dat per persoon 1906 calorieën per dag werd opgenomen. Op grond van "F.A.O. calorie requirements" werd vastgesteld dat rond 2,100 calorieën per persoon per dag in verband met de samenstelling der gezinnen een adequate voeding is voor wat de calorieën betreft. Naast granen (vooral gerst) vormen dadels en suiker een belangrijke rol in de voeding en zorgen respectievelijk voor 25% en 12% van de calorische waarden van de totale voeding. Vlees-en zuivelprodukten blijken een belangrijk onderdeel van de voeding uit te maken zodat ook de samenstelling van de voeding goed genoemd kan worden. Weinig verschil werd geconstateerd in de calorische opname tussen pachters en zelfstandige boeren en de samenstelling van de voeding.

Het percentage van het inkomen dat aan voedsel wordt gespendeerd kan 80 tot 90% bedragen in gebieden waar de bevolking over zeer lage inkomsten beschikt. Dit welvaartsniveau kan ook worden weergegeven door de welvaartsfactor (W). Dit is het quotient totale uitgaven/uitgaven voor voeding. Voor zelfstandige boeren en pachters is de levensstandaard berekend en in grafieken weergegeven. De boeren in het Hilla-Diwaniya gebied hebben een lage levensstandaard.

In minder ontwikkelde gebieden worden grote gedeelten van de bedrijfsproduktie direct geconsumeerd en worden slechts geringe hoeveelheden in de markt te gelde gemaakt. In het gebied verkopen de pachters 52% van de produktie, welke na alle betalingen in natura voor de boer overblijft, terwijl de zelfstandige boeren slechts 36% verkopen.

In gebieden met lage inkomens reageert de suiker consumptie het snelst op een toename van het inkomen. Dit bleek ook toepasselijk voor het Hilla-Diwaniya gebied. In het grafisch uitgezette verband van inkomen per hoofd en suikerconsumptie is ook de voor dit soort kurven typische 'S' vorm duidelijk aanwezig.

In een zelfvoorzieningseconomie produceert de boer alle produkten die hij voor zijn eigen bestaan en het bestaan van zijn gezin nodig heeft. De bedrijfs-grootte wordt derhalve aangepast aan deze behoeften en aan de beschikbare arbeidskrachten. Een mathematische verwerking van de gegevens van 195 boerderijen werd uitgevoerd om na te gaan in hoeverre de op theoretische gronden te verwachten relaties van de zelfvoorzieningseconomie in dit gebied opgaan.

Voor deze gebieden geldt $F \cdot C = A \cdot P \cdot R$.

F = familiegrootte

C = voedselconsumptie per persoon

A = bedrijfsgrootte (in mesharas)

P = opbrengst minus zaad (per meshara)

R = rotatiefactor = $\frac{\text{bebouwd areaal}}{\text{totaal bedrijfsareaal}}$

Uit de berekeningen blijkt dat de pachters 83% van hun graanopbrengsten gebruiken voor uitgaven in natura terwijl 50% van de huishoudelijke uitgaven plaats vinden in geld. Voor de zelfstandige boeren zijn deze cijfers respectievelijk 46 en 37%. Van de voeding wordt echter resp. 75% en 83% direct uit het bedrijf betrokken. Aangezien er niet wordt gespaard moet de netto bedrijfsproduktie gelijk zijn aan de huishoudelijke uitgaven. Het boven aangegeven verband wordt echter gecompliceerd, indien "cash crops" en vooral veeteelt, een belangrijk onderdeel van de bedrijfsproduktie leveren. Dit nu is, in het bijzonder wat de veeteelt betreft in het Hilla-Diwaniya gebied het geval. In de voeding wordt hier slechts 26% ingenomen door de basis voedselprodukten (granen, dadels, groenten) voor zover het de pachters betreft en slechts 26.6% in het geval van de zelfstandige boeren. Veeteelt produkten nemen respectievelijk 47 en 50% voor hun rekening.

Dit alles heeft tot gevolg dat de simpele formule voor wat betreft het verband bedrijfsgrootte en de primaire produktie aan basis- voeding – de basis van het zelfvoorzieningsbedrijf – niet geldt voor de zelfstandige boeren. Bij de deelbouwers blijkt dat via de netto basis voedselproduktie dit verband wel aanwezig is.

Tot slot wordt het verband tussen bedrijfsgrootte en arbeidskrachten, tussen gerstopbrengst en bedrijfsgrootte, tussen netto-inkomen en bedrijfsgrootte, tussen bruto-inkomen en arbeidskrachten en tussen netto-inkomen en arbeidskrachten voor een aantal pachters en zelfstandige boeren mathematisch geanalyseerden in grafieken verduidelijkt. Regressielijnen en correlatiecoëfficiënten werden berekend. In tabellen worden de marginale produkties, netto-inkomens en bruto-inkomens per meshara en per arbeidskracht weergegeven.

ACKNOWLEDGEMENTS

I gratefully record my indebtedness to professor Ir. J. H. L. JOOSTEN, who holds the chair of agricultural economics of the tropics at the Agricultural University of the Netherlands, and who acted in his former post as director of the International Landdevelopment Consultants Ltd as my supervisor and guide. My thanks are also due to professor Dr. R. A. J. VAN LIER for useful suggestions.

My particular thank is due to Nederlandse Heidemaatschappij for the opportunity to collect the data in the field and for permission to use the records in their charge.

Special thanks go to Hercules Powder Company N.V. for allowing me to obtain valuable knowledge of the countries of the Middle East.

Moreover, I am indebted to various colleagues and friends for their help.

Last but not least I feel that without the willing cooperation of the many farmers in Iran and Iraq this study could not have been accomplished. Any success which this work may achieve I owe them.

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APPENDIX

Data of 99 tenants of Region 1 (T).

F = Family size.

L = Labourforce.

A = Farmsize in mesharas.

I_g = Gross income in ID per family/year.

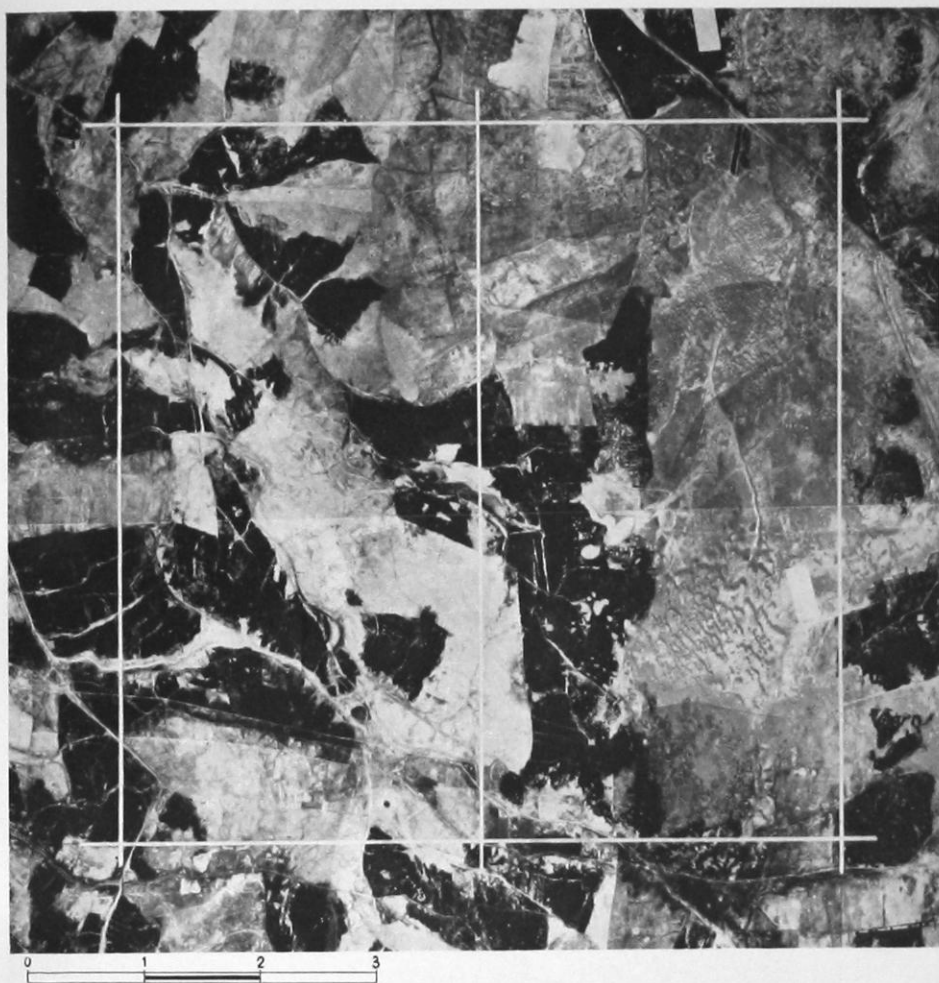
I_n = Net income in ID per family/year.

D = Food intake per family/year expressed in cost in ID.

| Num- ber | F | L | A | I _g | I _n | D | Num- ber | F | L | A | I _g | I _n | D |
|-------------|---|-----|----|----------------|----------------|------|-------------|----|-----|-----|----------------|----------------|-------|
| 1 | 3 | 1 | 10 | 26 | 25 | 24.0 | 51 | 8 | 2 | 70 | 196 | 78 | 57.7 |
| 2 | 3 | 1 | 20 | 48 | 32 | 27.2 | 52 | 8 | 2 | 64 | 197 | 78 | 57.7 |
| 3 | 4 | 1 | 40 | 45 | 33 | 27.4 | 53 | 8 | 2 | 60 | 199 | 78 | 53.0 |
| 4 | 3 | 1.5 | 45 | 38 | 21 | 20.0 | 54 | 4 | 2.5 | 20 | 121 | 49 | 36.8 |
| 5 | 3 | 1.5 | 14 | 42 | 23 | 21.8 | 55 | 5 | 2.5 | 80 | 126 | 68 | 53.7 |
| 6 | 4 | 1.5 | 15 | 49 | 25 | 24.0 | 56 | 7 | 2.5 | 80 | 146 | 83 | 54.0 |
| 7 | 4 | 1.5 | 18 | 54 | 27 | 24.3 | 57 | 5 | 2.5 | 100 | 158 | 70 | 56.0 |
| 8 | 4 | 1.5 | 20 | 57 | 29 | 25.8 | 58 | 5 | 2.5 | 40 | 163 | 71 | 60.4 |
| 9 | 4 | 1.5 | 20 | 62 | 30 | 25.5 | 59 | 6 | 2.5 | 40 | 165 | 72 | 60.0 |
| 10 | 4 | 1.5 | 20 | 63 | 39 | 32.0 | 60 | 6 | 2.5 | 40 | 166 | 73 | 47.5 |
| 11 | 4 | 1.5 | 21 | 63 | 35 | 30.1 | 61 | 7 | 2.5 | 43 | 172 | 83 | 58.1 |
| 12 | 4 | 1.5 | 22 | 65 | 28 | 25.5 | 62 | 8 | 2.5 | 50 | 174 | 87 | 60.0 |
| 13 | 4 | 1.5 | 23 | 69 | 30 | 25.5 | 63 | 8 | 2.5 | 55 | 177 | 95 | 65.6 |
| 14 | 4 | 1.5 | 25 | 72 | 33 | 32.0 | 64 | 9 | 2.5 | 60 | 184 | 98 | 65.6 |
| 15 | 3 | 1.5 | 30 | 74 | 28 | 24.4 | 65 | 9 | 2.5 | 60 | 187 | 101 | 70.7 |
| 16 | 4 | 1.5 | 31 | 75 | 29 | 25.2 | 66 | 9 | 2.5 | 70 | 188 | 103 | 72.1 |
| 17 | 4 | 1.5 | 38 | 75 | 32 | 25.6 | 67 | 9 | 2.5 | 80 | 200 | 107 | 76.0 |
| 18 | 4 | 1.5 | 40 | 80 | 34 | 32.0 | 68 | 8 | 2.5 | 50 | 218 | 110 | 81.4 |
| 19 | 5 | 1.5 | 40 | 80 | 47 | 42.7 | 69 | 8 | 2.5 | 50 | 223 | 111 | 70.9 |
| 20 | 5 | 1.5 | 44 | 80 | 49 | 45.0 | 70 | 5 | 3 | 51 | 177 | 65 | 48.4 |
| 21 | 5 | 1.5 | 48 | 85 | 50 | 41.0 | 71 | 6 | 3 | 38 | 195 | 77 | 50.0 |
| 22 | 5 | 1.5 | 50 | 90 | 51 | 42.8 | 72 | 6 | 3 | 40 | 201 | 77 | 50.8 |
| 23 | 5 | 1.5 | 55 | 91 | 53 | 40.3 | 73 | 6 | 3 | 40 | 203 | 81 | 60.7 |
| 24 | 5 | 1.5 | 60 | 94 | 54 | 43.7 | 74 | 7 | 3 | 90 | 211 | 91 | 61.9 |
| 25 | 5 | 1.5 | 60 | 95 | 54 | 40.5 | 75 | 7 | 3 | 110 | 218 | 97 | 67.9 |
| 26 | 4 | 1.5 | 71 | 107 | 45 | 40.5 | 76 | 8 | 3 | 80 | 240 | 109 | 77.4 |
| 27 | 4 | 1.5 | 80 | 111 | 42 | 35.7 | 77 | 8 | 3 | 80 | 243 | 110 | 80.3 |
| 28 | 4 | 1.5 | 80 | 117 | 40 | 35.6 | 78 | 9 | 3 | 90 | 250 | 121 | 88.3 |
| 29 | 4 | 1.5 | 80 | 129 | 65 | 48.8 | 79 | 6 | 3.5 | 90 | 201 | 89 | 65.9 |
| 30 | 3 | 2 | 38 | 53 | 30 | 26.4 | 80 | 6 | 3.5 | 70 | 204 | 93 | 70.8 |
| 31 | 2 | 2 | 14 | 56 | 35 | 14.3 | 81 | 7 | 3.5 | 64 | 207 | 105 | 71.4 |
| 32 | 4 | 2 | 15 | 65 | 37 | 31.4 | 82 | 7 | 3.5 | 80 | 216 | 107 | 71.7 |
| 33 | 4 | 2 | 18 | 92 | 38 | 32.7 | 83 | 7 | 3.5 | 82 | 228 | 108 | 70.2 |
| 34 | 6 | 2 | 21 | 98 | 43 | 32.3 | 84 | 6 | 3.5 | 100 | 264 | 111 | 80.8 |
| 35 | 7 | 2 | 20 | 100 | 47 | 37.6 | 85 | 6 | 3.5 | 100 | 267 | 114 | 80.6 |
| 36 | 6 | 2 | 20 | 103 | 49 | 40.7 | 86 | 10 | 3.5 | 110 | 268 | 121 | 76.4 |
| 37 | 6 | 2 | 20 | 107 | 51 | 40.8 | 87 | 9 | 3.5 | 130 | 275 | 125 | 80.0 |
| 38 | 6 | 2 | 40 | 107 | 54 | 45.9 | 88 | 9 | 3.5 | 132 | 281 | 125 | 80.0 |
| 39 | 5 | 2 | 42 | 122 | 56 | 46.5 | 89 | 8 | 3.5 | 140 | 286 | 135 | 82.4 |
| 40 | 5 | 2 | 44 | 125 | 56 | 47.0 | 90 | 11 | 3.5 | 110 | 291 | 138 | 85.6 |
| 41 | 6 | 2 | 50 | 139 | 60 | 51.0 | 91 | 11 | 3.5 | 140 | 300 | 166 | 91.3 |
| 42 | 6 | 2 | 60 | 142 | 61 | 51.8 | 92 | 11 | 3.5 | 125 | 302 | 167 | 96.2 |
| 43 | 5 | 2 | 61 | 151 | 61 | 45.8 | 93 | 9 | 4 | 130 | 219 | 121 | 72.6 |
| 44 | 6 | 2 | 65 | 153 | 64 | 51.2 | 94 | 10 | 4 | 105 | 265 | 129 | 81.3 |
| 45 | 5 | 2 | 70 | 154 | 67 | 50.3 | 95 | 11 | 4.5 | 90 | 289 | 159 | 101.8 |
| 46 | 5 | 2 | 71 | 158 | 67 | 51.6 | 96 | 12 | 4.5 | 150 | 342 | 203 | 111.7 |
| 47 | 5 | 2 | 64 | 168 | 70 | 53.9 | 97 | 9 | 5 | 140 | 345 | 214 | 128.4 |
| 48 | 6 | 2 | 48 | 171 | 72 | 61.2 | 98 | 9 | 5.5 | 110 | 348 | 217 | 138.9 |
| 49 | 8 | 2 | 60 | 173 | 76 | 53.2 | 99 | 10 | 5.5 | 178 | 388 | 243 | 150.7 |
| 50 | 8 | 2 | 50 | 188 | 78 | 56.9 | | | | | | | |

Data of 81 farmowners of Region 3 (F).

| Num- ber | F | L | A | I _g | I _n | D | Num- ber | F | L | A | I _g | I _n | D |
|-------------|----|-----|----|----------------|----------------|------|-------------|----|-----|-----|----------------|----------------|-------|
| 1 | 4 | 1 | 10 | 27 | 20 | 19.0 | 42 | 10 | 2 | 29 | 109 | 84 | 56.5 |
| 2 | 4 | 1 | 7 | 28 | 24 | 23.8 | 43 | 10 | 2 | 37 | 105 | 87 | 65.3 |
| 3 | 5 | 1 | 13 | 36 | 25 | 23.5 | 44 | 10 | 2 | 60 | 94 | 89 | 66.7 |
| 4 | 4 | 1 | 5 | 36 | 27 | 25.1 | 45 | 6 | 2.5 | 50 | 79 | 46 | 35.4 |
| 5 | 5 | 1.5 | 10 | 37 | 26 | 24.4 | 46 | 6 | 2.5 | 50 | 57 | 47 | 35.7 |
| 6 | 5 | 1.5 | 10 | 38 | 27 | 24.6 | 47 | 7 | 2.5 | 40 | 69 | 55 | 45.6 |
| 7 | 7 | 1.5 | 4 | 48 | 37 | 31.4 | 48 | 9 | 2.5 | 25 | 175 | 78 | 62.4 |
| 8 | 6 | 1.5 | 10 | 48 | 37 | 31.8 | 49 | 9 | 2.5 | 26 | 110 | 81 | 61.6 |
| 9 | 5 | 1.5 | 10 | 35 | 33 | 28.7 | 50 | 10 | 2.5 | 40 | 121 | 83 | 63.1 |
| 10 | 6 | 1.5 | 15 | 58 | 38 | 33.4 | 51 | 8 | 2.5 | 35 | 123 | 86 | 72.2 |
| 11 | 5 | 1.5 | 18 | 38 | 33 | 29.4 | 52 | 8 | 2.5 | 34 | 152 | 88 | 68.6 |
| 12 | 5 | 1.5 | 10 | 45 | 34 | 28.9 | 53 | 9 | 2.5 | 42 | 105 | 89 | 70.3 |
| 13 | 7 | 1.5 | 10 | 57 | 45 | 38.7 | 54 | 9 | 2.5 | 45 | 179 | 95 | 71.3 |
| 14 | 7 | 1.5 | 21 | 88 | 43 | 37.4 | 55 | 5 | 3 | 50 | 81 | 52 | 41.6 |
| 15 | 6 | 1.5 | 15 | 89 | 43 | 38.7 | 56 | 5 | 3 | 50 | 83 | 51 | 42.3 |
| 16 | 7 | 1.5 | 45 | 68 | 49 | 44.1 | 57 | 6 | 3 | 76 | 104 | 69 | 53.1 |
| 17 | 6 | 1.5 | 10 | 68 | 45 | 40.9 | 58 | 7 | 3 | 50 | 105 | 85 | 64.6 |
| 18 | 5 | 1.5 | 14 | 60 | 42 | 38.2 | 59 | 7 | 3 | 52 | 121 | 86 | 64.5 |
| 19 | 5 | 1.5 | 15 | 61 | 42 | 38.6 | 60 | 7 | 3 | 62 | 187 | 84 | 71.4 |
| 20 | 5 | 1.5 | 19 | 63 | 44 | 40.5 | 61 | 8 | 3 | 80 | 158 | 92 | 77.3 |
| 21 | 6 | 1.5 | 20 | 64 | 46 | 40.9 | 62 | 8 | 3 | 80 | 112 | 94 | 78.0 |
| 22 | 6 | 1.5 | 12 | 74 | 50 | 44.5 | 63 | 7 | 3.5 | 90 | 119 | 86 | 69.7 |
| 23 | 7 | 1.5 | 10 | 75 | 53 | 46.6 | 64 | 7 | 3.5 | 50 | 154 | 92 | 73.6 |
| 24 | 7 | 1.5 | 13 | 93 | 52 | 45.7 | 65 | 11 | 3.5 | 80 | 106 | 92 | 64.4 |
| 25 | 7 | 1.5 | 16 | 106 | 51 | 47.4 | 66 | 8 | 3.5 | 40 | 106 | 96 | 65.3 |
| 26 | 7 | 1.5 | 18 | 89 | 56 | 52.1 | 67 | 7 | 3.5 | 104 | 169 | 107 | 76.0 |
| 27 | 3 | 2 | 10 | 52 | 22 | 20.9 | 68 | 8 | 3.5 | 80 | 229 | 113 | 78.0 |
| 28 | 3 | 2 | 25 | 62 | 30 | 28.2 | 69 | 7 | 4 | 50 | 159 | 91 | 54.6 |
| 29 | 3 | 2 | 25 | 52 | 30 | 27.9 | 70 | 9 | 4 | 60 | 120 | 103 | 63.9 |
| 30 | 4 | 2 | 48 | 53 | 33 | 31.3 | 71 | 7 | 4 | 55 | 195 | 106 | 67.8 |
| 31 | 5 | 2 | 10 | 57 | 34 | 28.6 | 72 | 10 | 4 | 53 | 224 | 140 | 81.2 |
| 32 | 6 | 2 | 30 | 59 | 39 | 29.6 | 73 | 6 | 4.5 | 83 | 146 | 100 | 62.0 |
| 33 | 7 | 2 | 30 | 88 | 47 | 38.5 | 74 | 6 | 4.5 | 90 | 188 | 114 | 65.0 |
| 34 | 9 | 2 | 20 | 90 | 50 | 40.0 | 75 | 8 | 4.5 | 111 | 158 | 168 | 100.8 |
| 35 | 9 | 2 | 10 | 108 | 51 | 38.2 | 76 | 5 | 5 | 80 | 175 | 100 | 70.0 |
| 36 | 6 | 2 | 15 | 78 | 53 | 44.5 | 77 | 9 | 5 | 80 | 228 | 160 | 84.8 |
| 37 | 8 | 2 | 20 | 120 | 65 | 54.6 | 78 | 8 | 5 | 74 | 204 | 175 | 87.5 |
| 38 | 8 | 2 | 30 | 86 | 70 | 56.0 | 79 | 7 | 5.5 | 70 | 220 | 165 | 90.7 |
| 39 | 9 | 2 | 40 | 121 | 70 | 56.7 | 80 | 6 | 5.5 | 80 | 228 | 130 | 58.5 |
| 40 | 9 | 2 | 43 | 95 | 80 | 66.4 | 81 | 7 | 6 | 100 | 240 | 170 | 78.2 |
| 41 | 10 | 2 | 22 | 109 | 83 | 80.5 | | | | | | | |

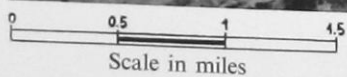
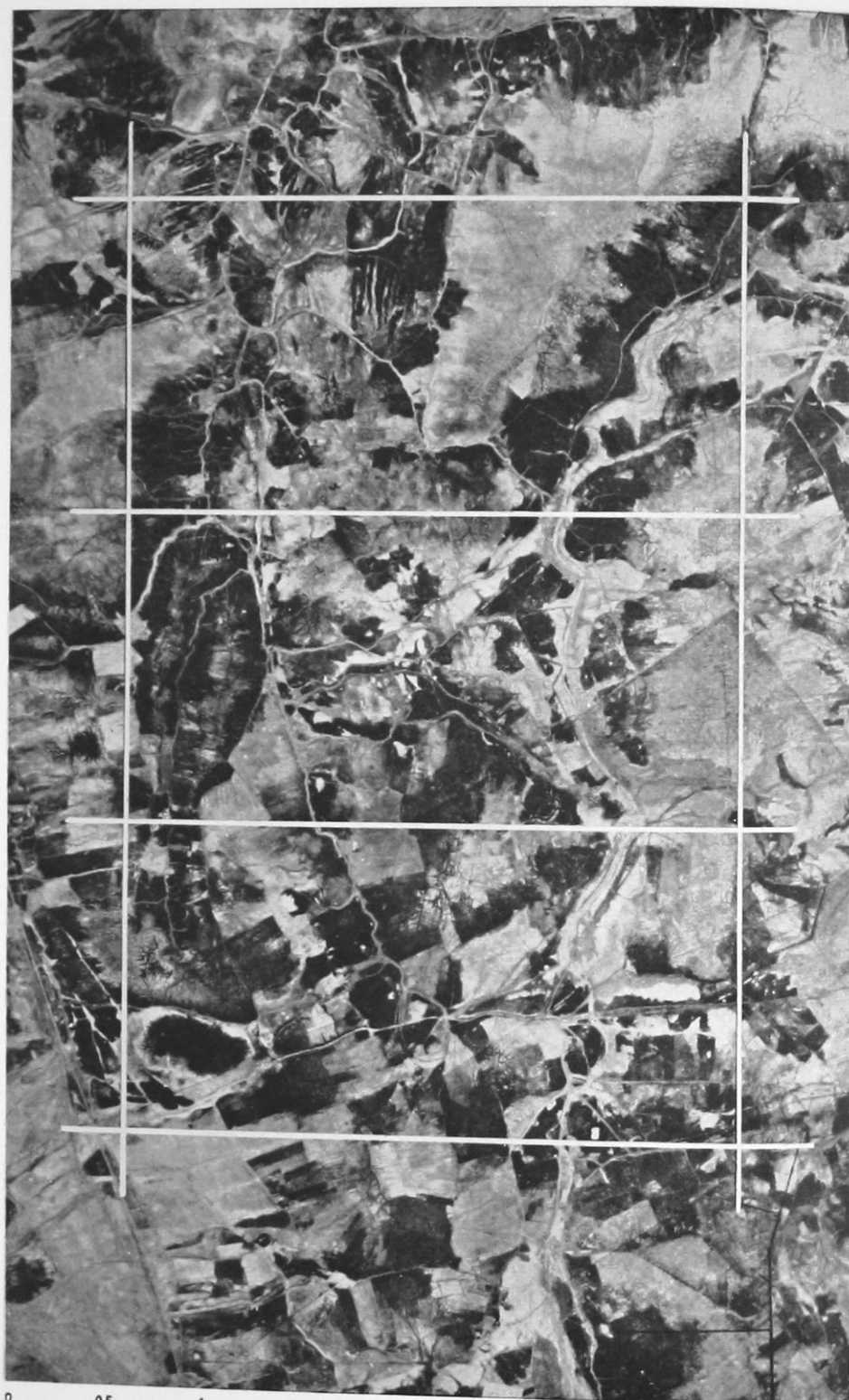


0 1 2 3

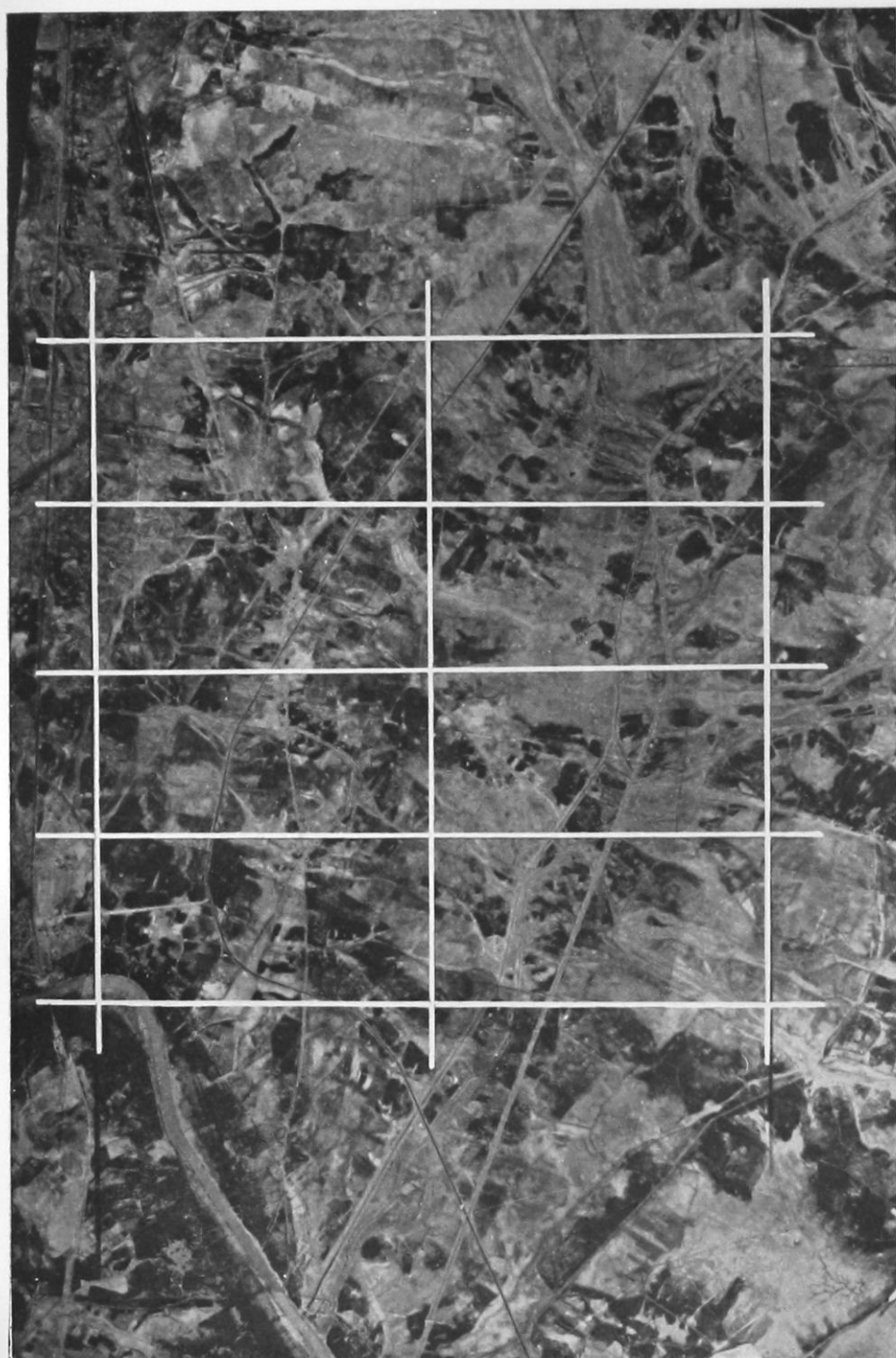
Scale in miles

Photograph 2-2

Area with holdings $> 4,000$ mesharas panelled into sectors of 20,000 mesharas



Area with holdings < 4,000 mesharas panelled into sectors of 5,000 mesharas



0 0.5 1 1.5

Scale in miles

Photograph 2-4

Farmowner's area panelled into sectors of 1,250 mesharas

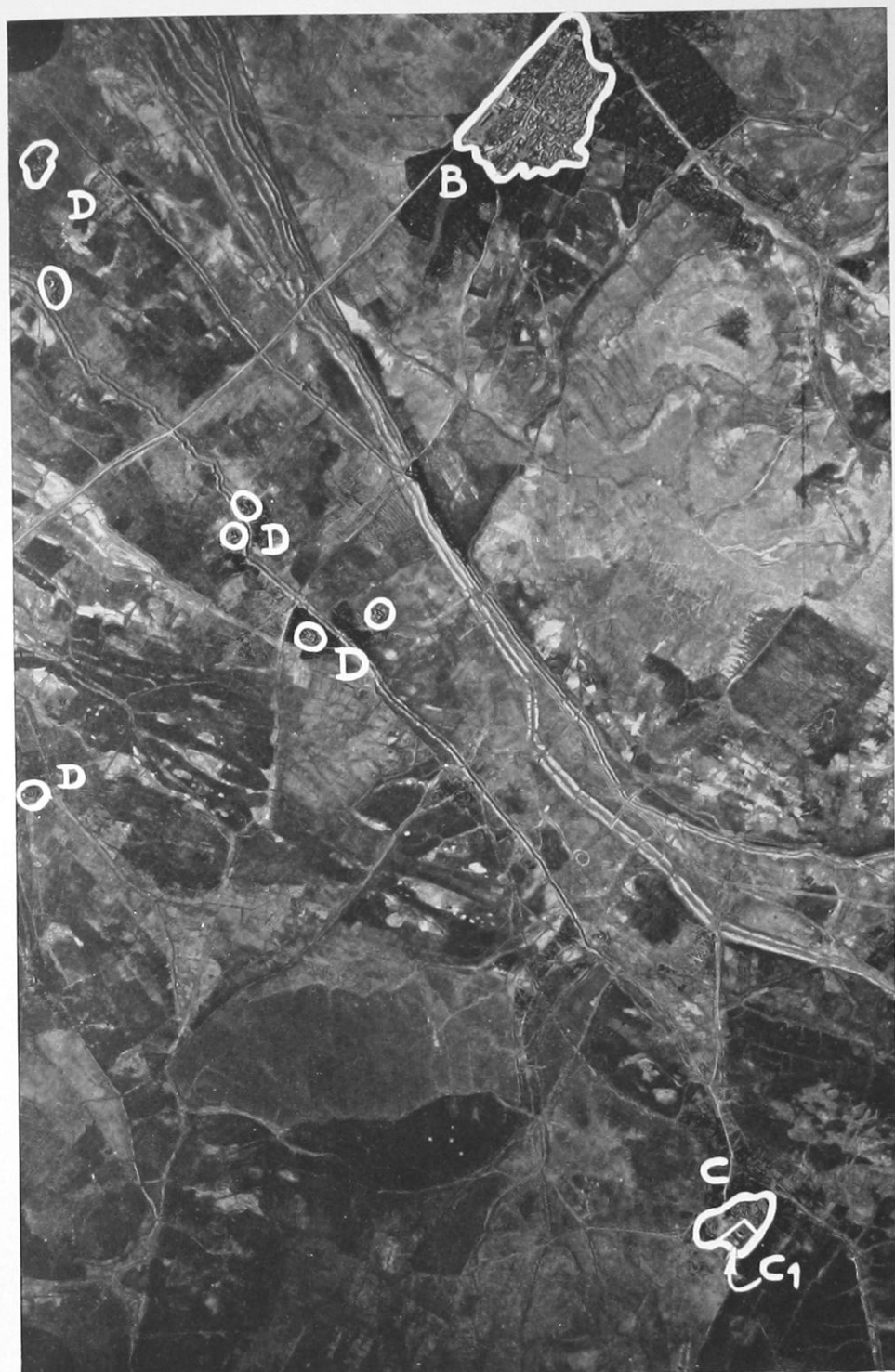


Scale in miles

Types of human settlements

- A Large urban settlement
- a Modern quarters
- a' Old quarters

Photograph 3-2



Photograph 3-3

Types of human settlements

- B Local market settlement
- C Village of tenants
- C¹ Dwelling of landowner
- D Rural settlements of farmowners